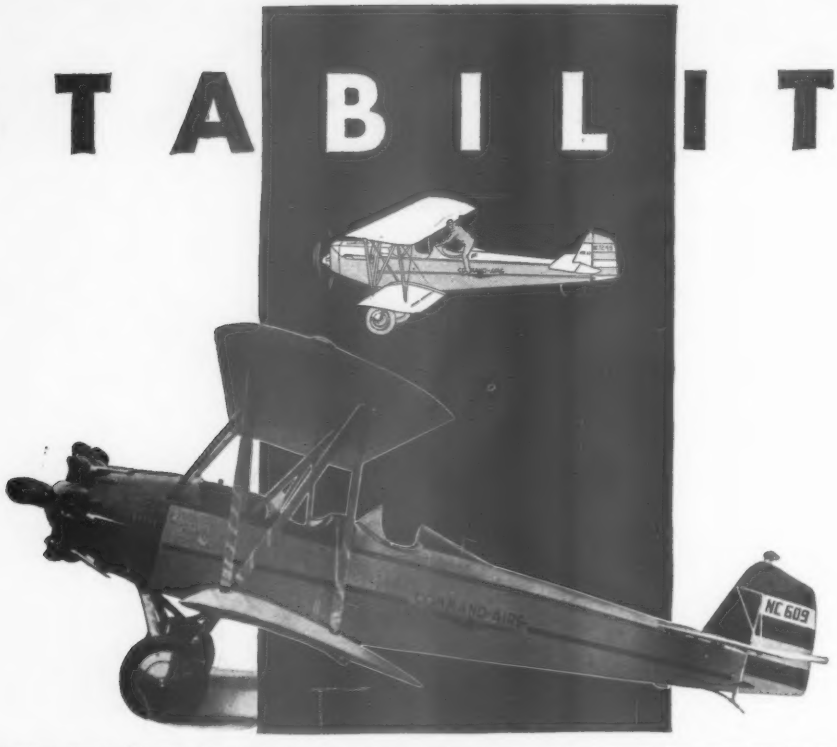
Aeronautics

***Is Congress Airminded?*—by Rep. F. H. La Guardia**

***Air Navigation*—by D. G. Jeffrey, R. N.**

XUM

STABILITY



Command-Aire 5-C-3 Powered with Curtiss-Challenger 170 H. P. Motor. See specifications below.

Stability always controls your COMMAND-AIRE

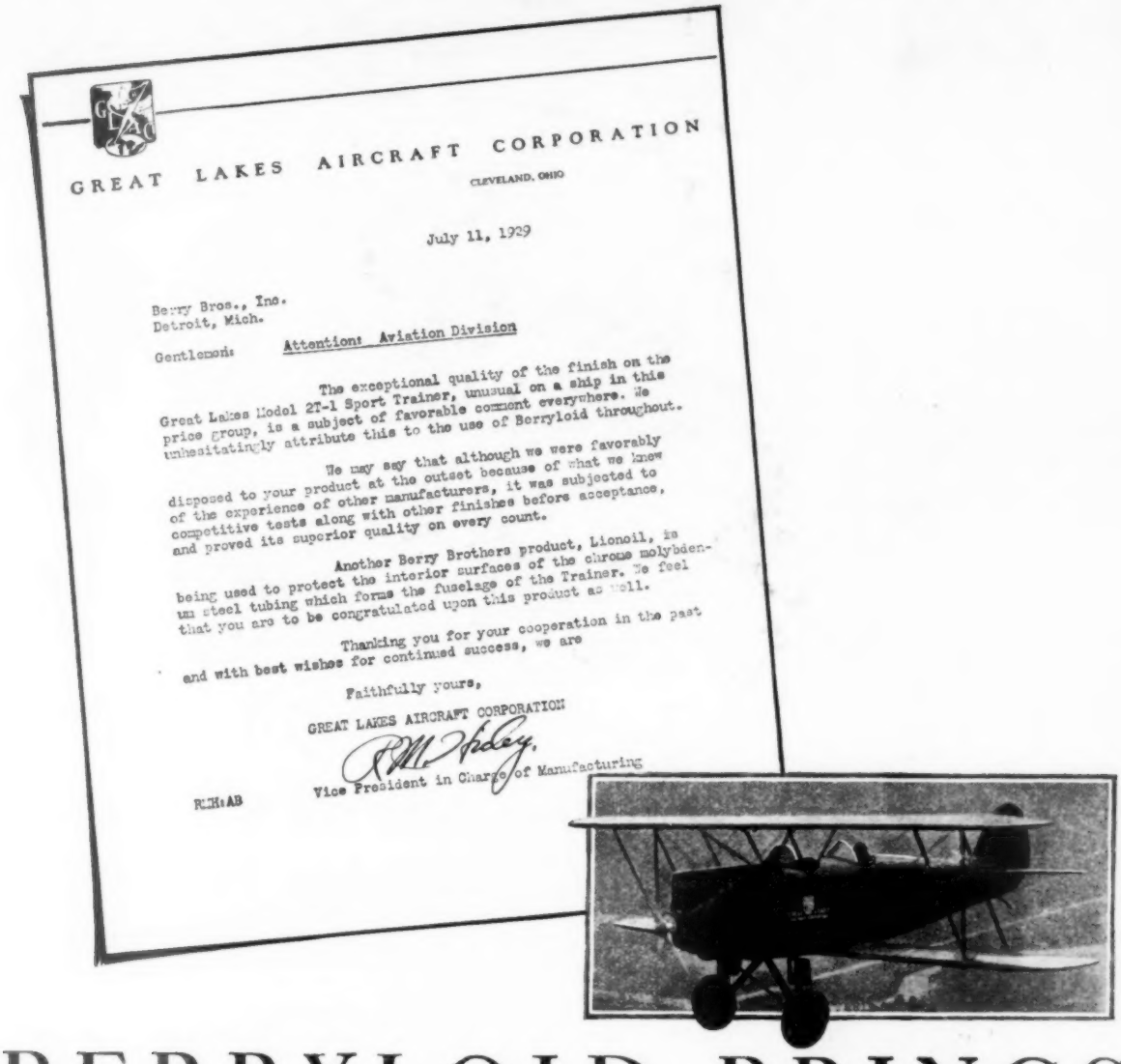
"UNCANNY," "epochal," "revolutionary," "incredible"... these are some of the terms which experts in aerodynamics have used in acclaiming the STABILITY of Command-Aire. Recently a pilot flew his Curtiss-Challenger powered Command-Aire from San Diego to Los Angeles in one hour and thirty-eight minutes, *without once touching the stick.* (Name and date on request.) Command-Aire test pilots demonstrate the uniformity of Command-Aire STABILITY by leaving the cockpit and straddling the fuselage in factory test flights, while their planes continue safely under perfect self-control. This is not in any sense a stunt, but only matter-of-fact routine performance by Command-Aire. ¶ Your Command-Aire takes off quicker on a steeper path. It flies under positive control at stall speed. *You know your plane will come out of any spin* . . . that you may land slowly in minimum space. Command-Aire is as safe and stable in flight as a boat running upon the water's surface . . . for as the boat floats upright because of correct engineering, so does your Command-Aire float upon the air. ¶ Slotted joining of ailerons to the lower wings is a vital factor in Command-Aire's unrivaled STABILITY—yet slotted ailerons are only one of Ten Cardinal Superiorities built in each Command-Aire. Our space is too short to tell you of the other nine, but our booklet will . . . and it's yours for the asking, along with a convincing demonstration flight. WRITE NOW, for both. COMMAND-AIRE, Inc., Little Rock, Ark.

COMMAND-AIRE

SPECIFICATIONS

Span Upper Wing	31 ft. 6 in.
Span Lower Wing	31 ft. 6 in.
Wing Area	303 sq. ft.
Height	8 ft. 4 in.
Length Overall	22 ft. 5 in.
Chord	5 ft.
Gap	5 ft.
Stagger	9 in.
Dihedral Upper Wing	None
Dihedral Lower Wing	2 Degrees
Gross Weight	2363 lbs.
Weight Empty	1448 lbs.
Useful Load	915 lbs.
Capacity	Pilot and Two Pass.
High Speed at Sea Level	130 Mi.
Landing Speed	35 Miles
Cruising Range	520 Miles

General Distributors: CURTISS FLYING SERVICE, INC., 27 West 57th Street, New York City



GREAT LAKES AIRCRAFT CORPORATION

CLEVELAND, OHIO

July 11, 1929

Berry Bros., Inc.
Detroit, Mich.

Gentlemen: Attention: Aviation Division

The exceptional quality of the finish on the Great Lakes Model 2T-1 Sport Trainer, unusual on a ship in this price group, is a subject of favorable comment everywhere. We unhesitatingly attribute this to the use of Berryloid throughout.

We may say that although we were favorably disposed to your product at the outset because of what we knew of the experience of other manufacturers, it was subjected to competitive tests along with other finishes before acceptance, and proved its superior quality on every count.

Another Berry Brothers product, Lionoil, is being used to protect the interior surfaces of the chrome molybdenum steel tubing which forms the fuselage of the Trainer. We feel that you are to be congratulated upon this product as well.

Thanking you for your cooperation in the past and with best wishes for continued success, we are

Faithfully yours,

GREAT LAKES AIRCRAFT CORPORATION

R.M. Ridley

Vice President in Charge of Manufacturing

RLH:AB

BERRYLOID BRINGS

Enduring Beauty to the

GREAT LAKES TRAINER

Berryloid lacquer makes the Great Lakes Trainer look as well as it performs. This trim little ship is protected throughout with Progressive Aircraft Finishes. When manufacturers choose Berryloid they insure enduring beauty for their planes. Let our aviation division serve you as it has the Great Lakes Aircraft Corporation and most other leading builders.

Manufacturer of Progressive Aircraft Finishes

BERRY BROTHERS
Varnishes Enamels Lacquers
Detroit Michigan *Walkerville, Ont*

Member Aeronautical Chamber of Commerce

HERE, GENTLEMEN, *is the Ideal Spot in all America for the* Aircraft Industry

The remarkable industrial growth of Los Angeles County may be attributed to:

Natural year 'round climatic advantages

Tremendous population growth

High per capita buying power

Abundance of contented labor

Low building costs

Low cost power

Largest concentrated market on Pacific Coast

Splendid transportation facilities

Economical access to Pacific Coast and export markets

Flying conditions are as nearly ideal the year 'round in Los Angeles County as anywhere in America.

U. S. Weather Bureau reports over the last 50 years show an average wind velocity of 5 miles per hour .... 355 days per year with sunshine .... 274 days per year when the temperature is neither above 80 nor below 40.

17 manufacturers of airplanes and 9 manufacturers of airplane motors have already located here.

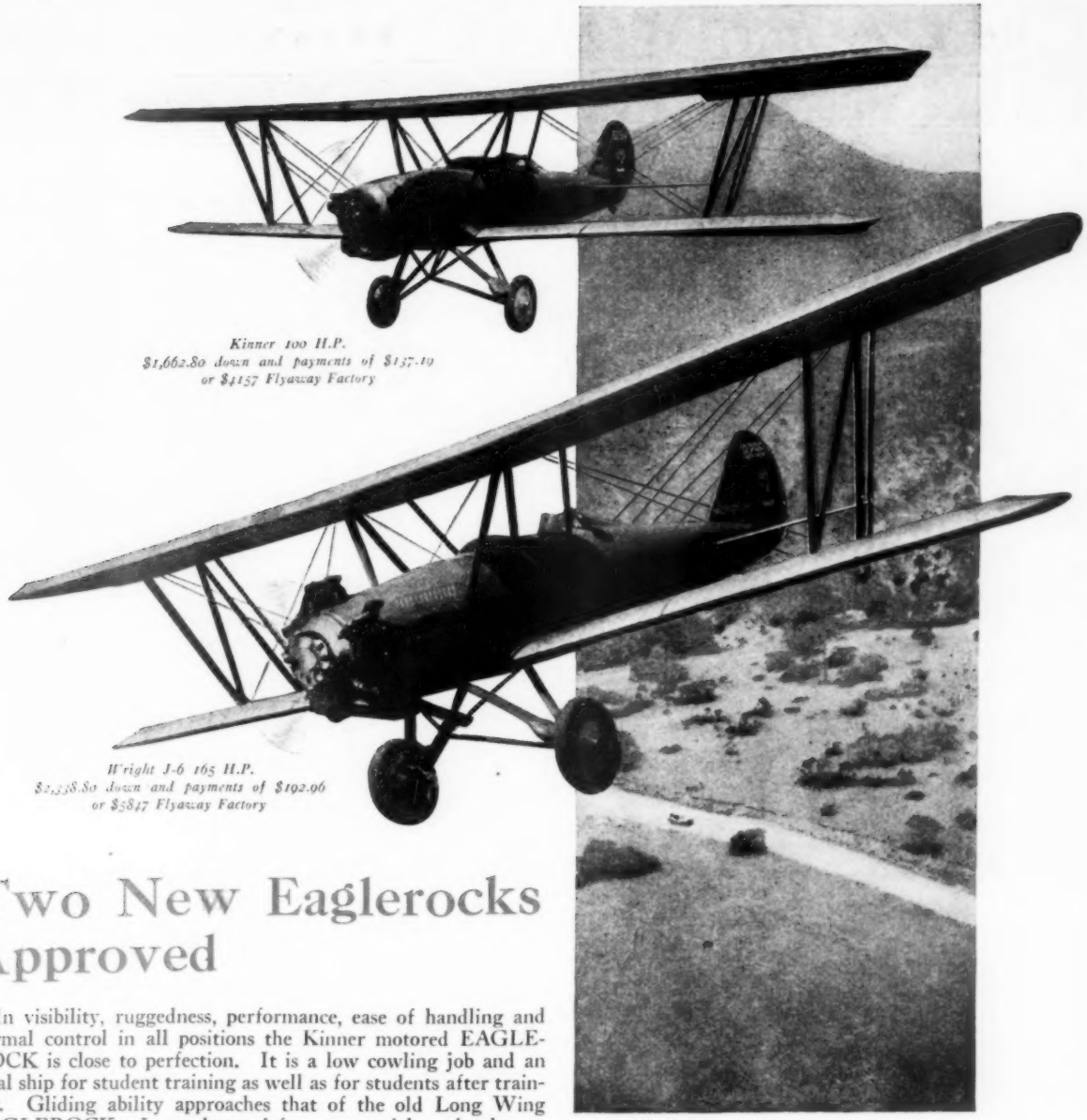
There are 25 or more aviation schools, 2200 aviation students, and more than 3,000 pilots in Southern California.

6 passenger transport companies operate 11 regularly scheduled lines out of Los Angeles, which is the terminal for 4 air-rail and 2 air-mail lines.

These are facts which the manufacturer of aeroplanes, motors or parts can turn to his profit .... for these conditions have a tremendous effect on production costs and successful operation .... and they are not paralleled elsewhere in America.

Air-Minded LOS ANGELES COUNTY

Complete detailed surveys and information supplied, upon request, by INDUSTRIAL DEPT., LOS ANGELES CHAMBER OF COMMERCE



Kinner 100 H.P.
$1,662.80 down and payments of $137.19
or $4157 Flyaway Factory

Wright J-6 165 H.P.
$2,338.80 down and payments of $192.96
or $5847 Flyaway Factory

Two New Eaglerocks Approved

In visibility, ruggedness, performance, ease of handling and normal control in all positions the Kinner motored EAGLEROCK is close to perfection. It is a low cowling job and an ideal ship for student training as well as for students after training. Gliding ability approaches that of the old Long Wing EAGLEROCK. It can be used for commercial work whereas most training ships are *one purpose* planes. We believe it to be the lowest priced three-place commercial ship with radial motor on the market.

The EAGLEROCK with Wright J-6, 165 h.p. motor is popular because of its performance, smoothness and small gas consumption. Those who want flying ability and economy in the medium price class will appreciate this model.

The EAGLEROCK line of biplanes includes ships powered with motors up to 225 h.p. Within this range you may choose a plane ideal for any purpose. All may be purchased on the time payment plan.

Eaglerock biplane fuselages are finished in the following colors: Eaglerock Blue, Orange, Red or Dresden Blue. In ordering state first, second and third choice.

ALEXANDER AIRCRAFT CO.

419 Alexander Industries Bldg.
COLORADO SPRINGS, COLORADO

Opportunities for Salesmen

To transport pilots, or salesmen who will hire a transport pilot, we will supply a ship at no cost and pay a liberal commission on sales—besides giving compensation for sales promotion work. It has been demonstrated that salesmen *can earn from $10,000 to $15,000 a year* under this plan. We provide a free sales training course, a list of prospects and other helps.

Time Payment Plan

Any Eaglerock may be purchased on the liberal A. A. C. time payment plan. This provides for 40 per cent of the flyaway price down and the balance in as many as twenty equal payments. The finance charge, which includes all interest, is 10 per cent of the unpaid balance. *No insurance is required.*

XUM

C.W. "SPEED" HOLMAN

FIRST with NATURALINE

in the Gardner Cup Race May 31st

Flying a Laird, powered with a T-4 Wright Whirlwind motor and fueled with NATURALINE, "Speed" Holman flew the 468 miles to Indianapolis and return, in 2 hours, 58 minutes and 40 seconds — an average speed of 156 miles per hour.

"I opened the throttle wide," "Speed" said, "and kept her there all the way."

Mr. Holman, who is operating manager of the Northwest Airways, St. Paul, Minnesota, made a test with NATURALINE shortly before he entered the race and stated that it reved up his Hornet engine at least 60 R.P.M. And after the race he remarked that he believed NATURALINE was "the finest fuel available for aviation purposes at this time."

1st

NATUR

Fueling "Speed" Holman's Laird

Mr. E. Roy Alexander, Race Manager, wired us after the race as follows:

GARDNER TROPHY RACE TODAY STOP NINE SHIPS STARTED FIVE FUELED WITH NATURALINE WINNING FIRST SECOND THIRD AND FOURTH PLACE STOP FIFTH SHIP FUELED WITH NATURALINE DOWN DUE TO FABRIC BLOWN OFF FUSELAGE STOP GREAT VICTORY FOR WONDERFUL FUEL CONGRATULATIONS.

Product of
NATURALINE COMPANY OF AMERICA
Chestnut & Smith Building
TULSA, OKLA.

SYDNOR HALL
SECOND *with* NATURALINE

Sydnor Hall flew a Travelair, powered with a T-5 and fueled with NATURALINE. He dived onto the Parks airfield seventeen minutes after "Speed."

Mr. Hall also was enthusiastic about NATURALINE. After the race in a letter to us he said, "I believe that this gasoline is the best gasoline made for aeroplanes at the present time. I particularly wish to emphasize the fact that NATURALINE is considerably lighter than the average and therefore should be especially adaptable for aeroplanes in which a minimum of weight is desirable."

Close upon Sydnor Hall's heels came Arthur J. Davis, flying a Waco powered with a T-5 Whirlwind and fueled with NATURALINE.

2nd

A L I N E

ART DAVIS
THIRD *with* NATURALINE

Then came John P. Wood two minutes later, in a Waco T-4, also fueled with NATURALINE.

A fifth plane fueled with NATURALINE, was forced down because the fabric was torn from the fuselage, forty miles from the finish. This was Irvin T. O'Dell's Cessna. Mr. O'Dell was in second place when the accident happened.

Five out of nine planes were fueled with NATURALINE, four of which took the leading places.

3rd

Fueling Sydnor Hall's Travelair

Pictures show the fueling of the different planes with NATURALINE

Fueling Art Davis' Waco

WRIGHT
AIRCRAFT ENGINES

SEVEN STAGES IN MAKING WRIGHT ENGINES

Nº 1..THE FOUNDRY

Wright is not simply an assembly plant. Between 90 and 95 per cent of the hundreds of parts in every Wright engine are actually made in Paterson in the Wright foundry and factory . . . The foundry, exclusive of the factory, covers 128,000 square feet. It turns out a daily average of 7,000 parts. The finest sands and purest aluminum are used in casting, and each aluminum part is put through twelve processes before it goes to the factory . . . To the making of airplane engines, Wright brings equipment and resources equalled by no other manufacturer. And the Wright foundry is justly recognized as the finest in the industry!

WRIGHT

AERONAUTICAL CORPORATION
PATERSON, NEW JERSEY
U. S. A.

Aeronautics OCTOBER 1929

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By Contrast

Glider entered at Rhone meet, over German meadow

Wide World

Volume 5, Number 4. Published monthly by Aeronautical Publications, Inc., at 608 South Dearborn St., Chicago, U. S. A. William B. Ziff, Editor and Publisher; B. G. Davis, Secretary-Treasurer; R. Stuart Murray, Advertising Manager; New York advertising office, 551 Fifth Ave., New York City. Subscription $2.50 per year; single copies, 25 cents; foreign postage, $1.00 per year extra. All contributions paid for at regular rates, but the publishers cannot be responsible for the loss of any manuscripts or material submitted. Entered as second class matter, January 23, 1929, at the Post Office, Chicago, Illinois, under the Act of March 3, 1879. Copyright 1929, by Aeronautical Publications, Inc. Member Audit Bureau of Circulations

AERONAUTICS Advertising Advisory Board: J. Don Alexander, C. H. Biddlecombe, Archibald Black, Stedman Hanks, P. G. Kemp, George Pynchon, Jr.

WORLD'S GREATEST AERONAUTICAL PUBLICATION

INFERNO

"Oh, God, it is a fearful thing
To see the human soul take wing
In any shape, in any mood . . ."

— *Lord Byron.*

"Simple duty hath no place for fear"
Whittier

From THE PUBLISHER'S QUILL

Aeronautics ADVOCATES

A unified air service with adequate appropriations.
A great National Air Academy.
Repeal of tax on gasoline sold on air fields.
Unified State and National laws governing aircraft.

PROTECTIVE LEGISLATION

A SHORT time ago we received a communication from Congressman John Cable of Ohio, who is considering the advisability of protective legislation covering the establishment, regulation and development of fixed transport lines and routes from city to city. He said:

"It seems to me if Congress should pass a law that when one responsible company has established a line from city A to city B, so long as such company maintains adequate service, a second company should not be permitted to compete with company No. 1. This should encourage the establishment of many routes, because the investment would thereby be protected, and the service thereby regulated. Only when public convenience and necessity require a second company as found through such agency as the Interstate Commerce Commission, should a second company be permitted to operate.

"This method is followed out in the establishment of motor transportation companies in Ohio. When one line has been granted a certificate, a second certificate along the same route is not permitted unless public convenience and necessity require. Likewise, on what is known as irregular routes for motor bus transportation companies out of a city and over any highway in the state from or to any city, after a sufficient number of irregular certificates have been granted in a city, no additional certificates or motor transportation companies are permitted to operate from that particular place."

Congressman Cable further requested our opinion and that of our readers on the advisability of such a Federal law applicable to aeronautics. Our own viewpoint was contrary to further legislation at this time, but in order to fairly estimate both sides of the question 'for immediate delivery,' we sent a round robin to a representative cross section of qualified executives and organizations, so that the opinion of the industry as a unit might be viewed.

We felt that this mass opinion would be of more value in properly guiding Legislator Cable, than any individualistic premise.

The viewpoint of AERONAUTICS is that legislation of this type would be a serious mistake, especially at this time, when the entire business of aerial travel and carrying is in very much of a formative state.

While it would be very desirable to protect young and struggling companies against undesirable competition, we believe it would be sheer folly to place the industry in a cast iron mold, which is exactly the effect this legislation would be calculated to produce. We do not believe that the results of such legislation would fulfill its intent.

We contend that there are several fundamentals of common law and ultimate public value, that would make a move of this sort decidedly unwise.

In the first place, from the viewpoint of good economies, an airway has no right-of-way to purchase or lease from the state. In this sense as a carrier it does not make use of public land or roads. It does not require the state or community to pay for the upkeep of a fixed route (as is indicated in the case of bus companies who make use of the common highways). Neither does it require a governmental subsidy to tide it over periods of mismanagement or natural difficulty, as in the case of the railroads. These latter in being granted and accepting a right-of-way, become immediately monopolistic in effect—a subsidized and in consequence partly socialized public utility.

It should be a matter of common prudence to declare the air sovereign free. Since it trespasses on no one's property, does not require the upkeep of the state, is not taxable, does not perpetrate a nuisance on any community, and is not a liability to the community in the event of bad management or failure, it should be subject only to regulations guaranteeing safety of human cargo. Even laws aimed at the inspection and specification of equipment should be carefully considered, and should be very elastic when finally made operative.

It should be borne in mind in this relation that regulation of this type, no matter how helpful the purpose actuating it, tends towards the ultimate centralization of tremendous power in the hands of politically appointed bureaucracy. A certificate of right-of-way becomes a favor, a political plum, handed out like paving contracts, to friends.

While it is true, as many letters on this subject to us have pointed out, that an unhealthy competition involving several competing lines in a locality capable of supporting only one comfortably, will tend towards inadequate equipment and dangerous and slovenly service, much can be said on the other side. A transport outfit secure in its franchise and indifferently managed, would be difficult to oust and would constitute a chronic stum-

bling block to aviation progress in its locality. It would be difficult to draw the line as to where its apathy to good service and progress laid it open to revocation of its licenses.

The entire effect would be of casting the aerial transport business into politics, achieving immediately the reverse result to that so ardently desired by the smaller transport companies, who have neither influence nor money to lobby with.

Another grave possibility is the amalgamation and control of manufacturers of equipment (planes, engines, etc.) who would take over existing franchises through direct or stock purchase. The control of transport lines by equipment manufacturers at this time is a logical and valuable creation of outlet for their products. It is founded on the sound construction of their planes, power plants and other equipment, and works out for the public good.

If, however, a condition were created where free competition were prohibited, the natural succession of events would soon find a manufacturer or factory, not in control of transportation companies, robbed of any possible market. Inventors would be forced to sell to existing companies, or emigrate to foreign countries to develop the fruits of their genius.

Small transport operators might finally find themselves unable to purchase the requisite up-to-date equipment at economic prices and would lose their certificates or be forced into line by the big combines.

The largest number of the communications from transport companies expressed the strongest desire for legal protection and the restriction of competitive activity. Their desires in this direction are understandable. We in the industry know that their path is not paved with roses. It is a sad commentary on good judgment when a second company enters a field or locality scarcely able to support one. This lack of immediate revenue possibility in itself should be enough to discourage competitive activity until the first company in the field has had the opportunity to solidify its position and gain a motion and good-will sufficient to be entered on its books as its major asset.

AERONAUTICS is aware that lack of all regulation is not a completely salutary condition, and in taking its stand, simply declares it as the lesser of two evils, with the good of the entire industry in mind.

Manufacturers declared themselves for the most part, against any legislation at this time, which some termed *dangerous* and others *meddlesome*.

It should be noted in this respect that Congressman Cable is an able and careful legislator of the highest type. He is author of two major Federal laws, *An Act Granting Independent Citizenship To Women*, and *Federal Corrupt Practices Act*. He also helped to write the Immigration laws. In such a man aviation has a friend, sincere and helpful.

We do not know what Congressman Cable's absolute convictions are in this matter. We conclude, however, that he will carefully weigh both sides of the question, both from the viewpoint of immediate and ultimate effect. The opinions we forwarded to him are vastly varied and will take a Solomon to adjudge.

Analyzing this mass of expression, the results indicate that the industry all told stands on the subject of regulatory legislation:

For 46%
Against 49%
Undecided 11%

This would indicate that the absolute attitude of qualified opinion is something of a toss-up. We are reprinting a number of letters received on page 55. Care has been taken to present varying points of view (the selection of these letters was based purely on their value as contributing to a general understanding of various slants on this important matter. More will be given next month. Necessarily, want of space prevents reproduction of all letters received).

Among those heard from were:

J. Don Alexander.....Alexander Aircraft Co.
W. H. Dixon.....U. S. Aircraft Engineering School
Edward A. Stinson.....Stinson Aircraft Corporation
Charles L. Lawrance.....Wright Aeronautical Corp.
R. Watts.....Russell T. Gray, Inc.
Walter H. Beech.....Travel Air Company
Arthur Balis .....The Technical Service Company
J. D. Lodwick.....Curtis Pneumatic Mchy. Co.
Henry Bolte.....Bolte Aircraft Corporation
J. G. Carr.....The Knoll Aircraft Corporation
J. H. Geisse.....Comet Engine Corporation
H. E. Barber.....Continental Air Lines, Inc.
A. M. Hall.....Hall-Aluminum Corporation
W. H. Bral.....Lycoming Manufacturing Co.
J. Lansing Callan.....American Aeronautical Corp.
C. W. White.....Bach Aircraft Co.
N. J. Boots..... Roosevelt Field, Inc.
Chester W. Cuthell.....Cuthell, Hotchkiss & Mills
Robert J. Smith.....Southern Air Transport, Inc.
Edmund T. Price.....Solar Aircraft Company
L. G. Mason.....Montgomery School of Aeronautics
T. E. Jones.....Mamer Air Transport
George M. Pynchon, Jr.....Pynchon & Co.
C. S. Story.....The Story-Gawley Company
W. B. Kinner.....Kinner Airplane & Motor Corp.
F. M. Smith.....Moth Aircraft Corporation
Joseph Blondin.....
George H. Boucher.....Pyrene Manufacturing Co.
L. Morton Bach.....Bach Aircraft Co.
W. O'Neil.....General Tire & Rubber Co.
Archibald Black.....Black & Bigelow
M. W. Mears.....Chappelow Advertising Company
John F. O'Ryan.....Colonial Western Airways
Geo. E. Stange.....Mono-Aircraft, Inc.
A. G. Ober, Jr.....Washington Air Terminals
P. G. Kemp.....Central Air Terminals Co.
Norman G. Warsinske.....Canadian-American Airlines
Frank D. Blair.....Canadian-American Airlines
Harold S. Lees.....Canadian-American Airlines
Karl S. Betts.....Detroit Board of Commerce
H. P. Mammen.....Parks Aircraft, Inc.
F. B. Rentschler.....The Pratt & Whitney Aircraft Co.
J. H. Chipman.....Barbour Stockwell Co.
F. J. Logan.....Logan Aviation Company
E. K. Ellis.....Eagle-Ottawa Leather Co.
M. H. Simmons.....The Dayton Airplane Engine Co.
H. C. Blake.....Nicholas-Beazley Airplane Co.
Glen A. Gunderson.....Burgess Battery Company
C. T. Austin.....
Carl H. Wolfley.....Bird-Wing Commercial Aircraft Co.
Jack Whitaker.....Szekely Aircraft & Engine Co.
Ariel G. Harris.....Rule & Sons, Inc.
Charles H. Babb.....Aircraft Finance Corp. of America
Robert S. Gans.....Aircraft Products Corporation
C. A. Van Dusen.....The Glenn L. Martin Company
H. L. Balderston.....Pioneer Instrument Company
Albert E. Evans.....Albert Evans, Inc.
Allen P. Bourdon.....Bourdon Aircraft Corporation
Earl L. House.....Earl L. House, Inc.
K. B. Walton.....Kents Aircraft Corporation
Paul W. Gardner.....General Airmotors Company
Charles S. Dion.....Jersey City Airport, Inc.
E. W. Cleveland.....Cleveland Pneumatic Aerol Co.
Brown Katzenbach.....Masonite Corporation
Parker Hill.....The Cleveland Chamber of Commerce
E. C. Lindsey.....Dynamic Mfg. Co.
Andrew L. Schaidler.....Aero Corp. of America
Enoch Prouty.....Prouty Motor Co.
R. H. Crane.....Aero Corporation of Dakota
M. M. Bonville.....The Argus Map Company
Reed G. Landis.....Reed G. Landis Company

PETITION.

TO THE NATIONAL CONGRESS OF THE UNITED STATES OF AMERICA.

WHEREAS - it has been amply demonstrated that the air represents the most mobile type of attack and communication, as well as defense in modern warfare; and

WHEREAS - American Military maneuvers have definitely proven that it is almost impossible to protect either land forces, cities or battleships from aggression via the air, and

WHEREAS - aerial supremacy will in the opinion of those subscribing to this resolution dictate both the military and commercial supremacy of the nation possessing it; and

WHEREAS - it has been amply demonstrated that only in unified direction can the requisite progress be accomplished; we hereby

RESOLVE AND PETITION the National Congress of the United States, to the following effect:

THAT a unified air service, under a competent head, who shall be Minister of Aviation, be appointed by the President of the United States, with a Portfolio in the President's Cabinet, with three assistants, one in charge of military aviation, one commercial and another experimental;

THAT a requisite appropriation be made by the National Congress which shall in all respects be proportionate to the appropriations for the Army and Navy, as well as those allotted for other commercial activities; thus allowing the aeronautical service and industry an immediate opportunity for rapid development and expansion.

ALSO that a School which shall be comparable to the present Academy at West Point, and the Naval Academy at Annapolis, be established, to which young men will go by rigid appointment, to the end that they will understand the air as their entire vocation, and that they may be educated into the high requirements of becoming an officer in the United States Military Service.

IT IS in our opinion both dangerous and fool-hardy for our country to continue in a quiescent state, representing the richest nation in the World, and remaining vulnerable to an attack which in our belief may not be withstood by the present military and naval forces. It is also our opinion that a competent committee should be appointed, free from lobby interests, who shall make a complete report to the National Congress concerning the recent military maneuvers, and concerning the economic prospects of rapid development for commercial aviation, and that this committee be appointed by the President of the United States, so that the people of the United States may be fully informed and the National Congress actuated into immediate consideration of what we believe is an immediate problem.

Wichita Lions Club ... By J R Engle President
Wichita advertising Club ... " Lee Lewis Pres.
The Wichita Chamber of Commerce ... " John [illegible] P.
Rotary Club of Wichita ... " [illegible]
... " E J Zimmermann Pres.
Wichita Kiwanis Club ... " John P Davidson
City of Wichita ... " By C S Lawrence M. yo.
American Legion ... " C V Wilson Commander
... "

A facsimile reproduction of petition to the National Congress

C. H. Biddlecombe.....Wright Aeronautical Corp.
Geo. W. Foster.....Love-Sultan, Inc.
G. S. Griffin.....Arthur Chevrolet Aviation Motors Corp.
E. A. Johnson.....Johnson Flying Service, Inc.
E. T. Asplundh.....Pitcairn Aircraft, Inc.
Gerald T. Murphy.....Mohawk Aircraft Corp.
Richland Auto Parts Co.....
N. W. Ayer & Son, Inc.....
A. Hargrave.....City Ice Co. of Kansas City
E. P. Cogswell.....Keystone Aircraft Corporation
Edward Emery.....Winfield D. Davis Co.
H. W. Alden.....Calif. Model Aircraft Supply Co.
Roy E. Mitchell.....Greater Brooklyn Flying Club
John S. Wynne.....Potomac Flying Service
J. F. Prince.....Wright Aeronautical Corp.
Sumner Sewall.....Colonial Airways Corporation
Roy E. Russell.....Fokker Aircraft Corporation
James G. Woolley.....Western Air Express
J. B. Webster.....Rogers Aircraft, Inc.
W. G. Schauffler, Jr.....Interstate Airlines, Inc.
W. C. Young.....Goodyear Tire & Rubber Co., Inc.
C. P. Russell.....Continental Motors Corporation
Jos. J. Hagen.....Western Screw Products Company
G. H. Roberts.....The Simplex Aircraft Corporation
Tex Marshall.....Thompson Aeronautical Corp.
T. J. Elias.....G. Elias & Bro., Inc.
Joseph Henry O'Neil.....Claude Neon Lights, Inc.
Phil J. Cannon.....K-O Manufacturing Corp.
Edgar N. Quinn.....Royal Airways Corporation
Francis Rogers.....Advance Aircraft Corp.
G. W. Vaughan.....Wright Aeronautical Corporation
R. Mulholland.....California Panel & Veneer Co.
L. C. McCarthy, Jr.....Miami Aircraft Corporation
Ben S. Hunter.....
J. Leopold.....Consolidated Instrument Co. of America
Alfred Frank.....National Parks Airways, Inc.
Dudley M. Steele.....Richfield Oil Co.

WICHITA AIR OIL RIGHT!

EVERY once in a while some mushroom or orchid springs up out of the fathomless night. These things spring from sources hardly expected, and gather their impetus from obscure factors sequestered from all but the sight of chance.

Wichita, Kansas, gem of the Southwest plains, is such a place in point. A few years ago it was a bum collection of prairie houses. Today it is a bustling, aggressive garden city. Its population has swelled to 110,000 people. It is rapidly growing out of its pants.

The city of Wichita and its history is of the utmost importance to aviation. It is one of its cornerstones and one of its hopes.

The surest way to become unpopular and commit financial suicide is to tell the truth where the truth is counter to conflicting ambitions. When the writer plunged head foremost into the debatable glory of publishing and editing, it was one of the perils he took into account.

We could easily restrict ourselves to manufacturers' publicity, much of it of doubtful accuracy. We could glad hand everybody and say nothing of consequence, and be that innocuous and colorless contraption called a "trade paper." This would meet with the full approval of the accounting department.

We are simply touching taboo subjects *because no one else will,* and because when we strung John Whittier's cryptic remark onto the head of our editorial page, we meant it.

AERONAUTICS has been holding forth at length in favor of a free and co-ordinated air service and a great National Academy of the Air, similar to the present schools of West Point and Annapolis. We further held that in order to bring this program to a successful termination it required obvious support and a definite program to replace the ineffectual and vapid conversation which had clothed it previously.

As part of our active idea we nominated Wichita as the probable and most likely seat for such an academy.

We felt that Wichita merited this consideration for briefly the following reasons:

1. It is easily the most air-minded city in the United States.

2. Aviation manufacture and transport is one of the major industries of the town.

3. Practically in the center of the country, its strategic position is almost unassailable, and it is secure against the possibility of surprise attack.

4. An Academy of the type we advocate should be considered from the viewpoint of a laboratory of inestimable commercial value, as well as from the purely military angle.

5. Its climate admits of the most judicious mixture of both good and difficult flying weather.

6. The city is laid out in an atmosphere of sheer beauty, and both in location and size would be a wholesome influence on the type of young men who would be appointed to such an Academy for training.

7. The whole surrounding country is as flat as a table and is one of the few vast natural flying fields available.

8. Amphibian flying can be made possible by the construction of an enormous inland lake at this point (this is already very much under consideration).

9. Great impetus would be added to the development of the entire Southwest section, tending to equalize the balance of population and adding immeasurable wealth to the nation.

10. Most important perhaps of all, the business of Wichita is run by young men who do not hesitate to act upon their convictions. Their courage and vitality as a unit represents an anchor for any cause, half lost and wandering without definite orientation.

Impressed with this rapid, lusty growth, a group of visiting Texans coined the apt phrase: "Wichita air oil right."

Justifying the faith AERONAUTICS held in its possibilities as an active advocate of a cause it believed in, we have just received the following petition addressed to the National Congress, reproduced on the previous page.

IT is practically assured that members of Congress serving from the State of Kansas will actively sponsor measures aimed to make this National Air Academy a fact. We also hope they will as cordially view the need for a distinct air ministry.

We are looking forward to similar and corroboratory resolutions from cities, flying clubs and other interested organizations all over the Nation. These indications of support will undoubtedly enlist the active aid of other legislators from all sections. We believe that the apathy surrounding the situation is being lifted and that the program espoused by AERONAUTICS as practically a lost cause, will be bitterly fought for by advocates of American aerial supremacy, in and out of the legislative halls.

As an announcement of major importance, Congressman Fiorella La Guardia of New York has agreed to lead the battle in the next Congress. Representative La Guardia, a member of the important Judiciary Committee, is a flyer of some parts himself, and is known for his fearless tongue and masterful logic in debate.

[*Continued on page 112*]

Combining
Airplane and Automobile Sales

by ANDREW R. BOONE

MANUFACTURERS of airplanes and accessories will do well to give a thought to automobile distributors and dealers. A considerable opportunity exists for distribution through this broad channel. The idea that automobile dealers will provide a profitable means for distribution, especially when use of airplanes becomes somewhat more universal, is not entirely original.

The same conclusion has been reached by more than one automobile dealer. These men, having entered the aviation field, are adapting their organizations to its service.

Manifestly, the airplane and the automobile are closely related. Much of the progress in building and selling airplanes and engines has been predicated on the experience of the automotive industry.

As a case in point, James Menefee, president of the Menefee Airways, Inc., and of the Menefee Motors Company, Inc., of New Orleans, has found the airplane-automobile tie-up to be valuable. Menefee Airways not only sells airplanes, but also conducts a school where prospective purchasers are taught to fly. Menefee keeps separate his automobile and airplane organizations, the latter handling planes and accessories only.

From the automotive point of view, dealers should look into the matter of merchandising airplanes, since it offers a profitable adjunct to their already established business without a great increase in overhead.

"In a few years," according to Mr. Menefee, "a garage or automobile dealer who doesn't handle or repair airplanes or does not operate another garage solely for the purpose of selling or repairing airplanes will be considered behind the times. To promote airplane sales, it is necessary, first, to advertise the fact that a company is ready to supply the needs of a city with airplanes and accessories. This can be done in no better way than having a large opening for the local field. We originally entered the aviation business for the advertising and pleasure we might derive. After familiarizing ourselves with aviation in its present stage, we learned that the business principles applying to the automobile industry were just as necessary in the aviation industry. After having received considerable publicity, we felt that by applying good business policies we could realize a profit from the aviation division of our business as well.

"It is my frank opinion, that, considering the situation from every angle, these two businesses, while operated under the same name and the same general supervisory board, should be under entirely separate and distinct management, with separate capital and headquarters. Also, I believe that eventually most automobile distributors with sufficient capital will have, in addition to the regular automobile business, an aviation branch at the municipal or other airport, and will have on display from time to time a demonstrator in their automobile salesroom. This will give publicity to both the airplane and the automobile companies. Of course, in some localities this arrangement may not prove feasible. Our aviation activities since their beginning have shown a profit."

No doubt many airplane and parts manufacturers at some time or other have wondered just how they could fit the airplane into the automobile business. Since automobile dealers already were selling transportation, many have felt the newer transportation falls naturally within their province.

Airplane manufacturers in analyzing the possibilities here confront a situation with which they already are familiar—that of pioneering. No good automobile merchant wants to pioneer a new line;

[*Continued on page 96*]

Underwood & Underwood

A second hand plane on sale at an outside auto dealers place at Chicago, Ill.

Where Does Congress Stand?

by REPRESENTATIVE F. H. La GUARDIA

AN INTIMATE DISCUSSION

Congressman La Guardia, who was recently nominated for Mayor of New York City on the Republican ticket, is one of the ablest figures our Congress has produced.

Much feared in debate, his recent decision to champion the separate Air Service and Air Academy, advocated by AERONAUTICS, *is calculated to give virile action to a previously much-discussed but dominant program.*

Underwood & Underwood

HON. F. H. La GUARDIA

REPRESENTING
20th District, N. Y. Major U. S. Air Service and Commander American Flying Force, Italian Front during World War. Decorated War Cross.

IF the United States has not a unified, well-equipped and the most efficient air service in the world it is not the fault of Congress. It is the fault entirely of the Army and Navy. Congress is now air-minded. It is in the mood to provide money generously for the development of Aviation. Naturally in aviation legislation as well as appropriation Congress is guided entirely by the advice of so-called experts. Aviation so far as its relation to Congress is concerned has to date been mostly from the military side. Congress up to 1914 had little confidence in the development, practicability, and future of aviation. A few paltry dollars were appropriated for experimental purposes, but so little encouragement was given by Congress to aviation that, as every one sorrowfully remembers, the Wright brothers were so discouraged that they took their plane to France where it seems there was a better understanding, more sympathy and perhaps more parliamentary vision. After the World War in 1914, even Congress grew to learn that aviation was of the utmost importance for both offensive and defensive purposes. The growth, development and scope of aviation in the first three years of the World War was such as to make Congress feel very much ashamed of itself, owing to its neglect to keep abreast in this field. When 1917 rolled along and the United States entered the World War, Congress in its anxiety to correct its sins of omission in the past, jumped at the opportunity to demonstrate its appreciation of aviation and appropriated six hundred forty million dollars ($640,000,000.00) for aviation. It was a lump sum appropriation. Congress practically said, "We have done nothing in the past. We have not experimented. We have no equipment. We have failed to appropriate heretofore. We know nothing about it. Here are six hundred forty million dollars ($640,000,000.00). Go ahead and build up an air service." Out of the six hundred and forty million dollars the United States built up the finest personnel, flyers and enthusiasts in the whole world and collected an enormous amount of junk, obsolete equipment and cost-plus contracts. The flying personnel was the best, the equipment the worst of any country in the world. Immediately after the signing of the Armistice the enthusiasm of the boys of the air service became contagious and there was a real movement in this country for the development of an Air service. The cost-plus contractors and other junk dealers who had grown rich during the War were quick to grasp the situation and coined the catchy phrase "We will never be caught unprepared again," and started their lobbies working in Washington. Here was the plan. The Liberty Motor, obsolete by the time it got into production, pieced together by well-meaning but mediocre engineers, and introduced to the country by the most efficient, active, expert group of publicity agents, was about all we had out of the six hundred forty million dollars. We certainly had plenty of them. The "never to be caught unprepared again plan" consisted in getting Congress to appropriate for the manufacture (after the war) of twenty-thousand additional Liberty motors although we had over twelve thousand on hand then, and to put each motor in a can of oil and keep it in reserve for the next war. That sounds almost incredible now, but that proposition was actually suggested to the Military Affairs Committee of the Sixty-Sixth Congress. By the time all the flyers got back from the other side and those who did not get across got back to their homes, the people of the country became better acquainted with the Liberty Motor. The plan did not get very far. It was impossible for a time to estimate just how many of the motors we had on hand. I finally got a resolution through the House which required the War Department to submit a report to Congress showing the number of motors on hand. It is my recollection that the report showed that we had over twelve thousand Liberty motors on hand. It took me ten years to prevent the use of these old motors in new planes. It was not until the appropriation bill for the year 1929-1930 which passed the House last session of Congress that I succeeded in writing into the bill a provision that these old motors must no longer be used in new planes. It took ten years of fighting, bickering, and loss of life and good planes to put an end to the use of these antiquated and obsolete motors. This is but one

instance showing the conservatism of the War Department whose judgment Congress habitually follows. The Air Service of course is not to blame. But before the flyer or the engineer or the expert of the Air Service can get to Congress, he must go through so many channels, bureaus and offices that by the time he reaches a Congressional Committee it is not the view of the Air Expert but that of the general staff who, as far as aviation is concerned, seems still to be fighting the Indian Wars over again. When one gallant officer of the Air Service volunteered to talk and talk freely and to tell the truth, he was court-martialled. General William Mitchell did more for the good of aviation and for the education of Congress on this subject than all the rest of the country put together. The Army succeeded in court-martialling General Mitchell but it did not suppress him. The truth was out. Were it not for General Mitchell we would not have had the five-year air building program for Army and Naval aviation. Were it not for him Congress could never have learned to take the views of the general staff and the admirals with a grain of salt. Now if somebody else would only speak out again and get court-martialled perhaps Congress would entirely ignore the views of the general staff and the admirals, and establish a separate unified Air Service. The Unified Air Service is inevitable. It must come. Of course the general staff can retard it as it did the Lewis machine gun; of course the Navy can hold to its own views for a certain length of time as it did in opposing the Ericcson propeller and the iron-clad ship, but not even the general staff or the Board of Admirals can stop progress. Just as General Mitchell shamed the country and brought about the first constructive building program, so will the progress of aviation and its development in other countries bring Congress to the point of disregarding the views based on purely selfish reason coupled with lack of vision of the general staff; and the board of admirals and a real honest-to-goodness separate independent Air Service headed by a civilian official of equal rank to the head of the Army and Navy and administered and officered by flyers, is coming, and coming within a very short time.

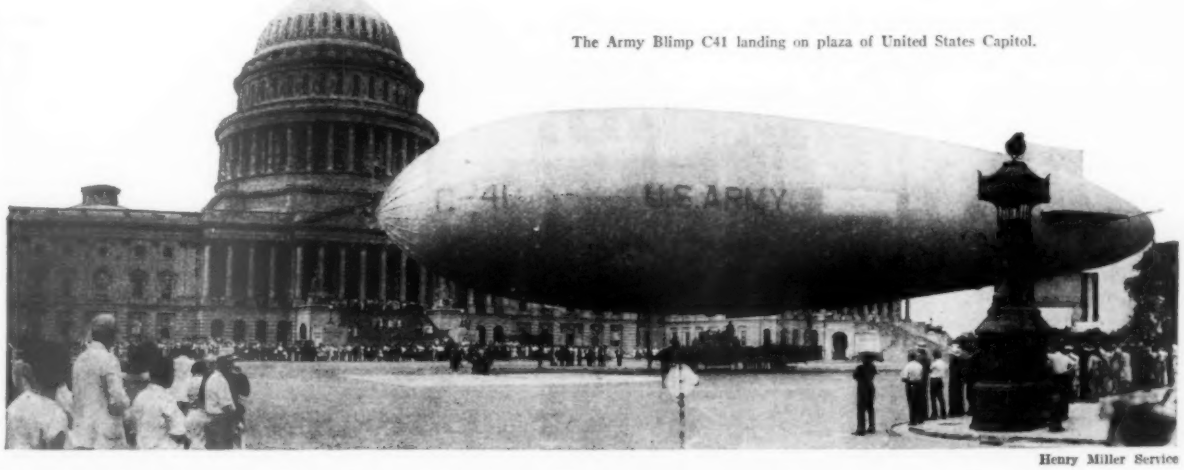
While the five year building program and appropriations therefor may well be considered as a great step forward and while it has given the Army and Navy better equipment it is by no means the last word in aviation legislation. The mere fact that there is a program for the Army and a different program for the Navy suggests immediately duplication, over-lapping, and an unpardonable waste of public funds. The Navy has perhaps managed its program better than the Army. It was quick to discard the water-cooled motor and adopt the newer type air-cooled motors. It is far ahead of the Army in its motors on pursuit ships. The Army has developed a splendid personnel but its equipment leaves much to be desired. After spending a huge amount of money on a fanciful helicopter and almost a million on a great big, clumsy, no-good bomber out at Dayton, it has been very slow in taking advantage of the development and improvement in the art of both motor and plane.

Along with the five year building program the law was also changed, providing for a head of the Air Service in both the Army and Navy, rated as an Assistant Secretary. The purpose of that law and the intent of Congress was to make the Assistant Secretary for Aviation in both the War and Navy Departments, a real distinct head of the Air Service of the respective departments. He was to be the boss. It was the hope of Congress that in so doing they could still adhere to the views of the old generals and the old admirals in their old ideas of keeping Air Service in each department and at the same time create a separate independent Air Service with own head and officered and counselled by experts. Unfortunately it has not entirely so worked out. While the Assistant Secretaries have been excellent men and aviation enthusiasts, experienced and expert in flying, they have both been quick to succumb to department loyalty instead of air loyalty, and while privately and semi-officially they have expressed a sound understanding of the needs of the Air Service, they have invariably gone along with the views of the Secretary of War or the Secretary of the Navy, which in turn were only the views of the general staff or the board of admirals. What a splendid opportunity both of these young men lost.

Just why a separate and unified Air Service is anathema to both the War Department and the Navy Department, the while they are slowly conceding the possibilities of aviation (which they do reluctantly and only after accomplished facts are so well known that they can no longer be denied or ignored) is not difficult to see. They are well provided with all sorts of reasons and justifications for a separate Air Service. It is perhaps not strange, however, that the Navy will admit that one Air Service perhaps would be more efficient, more economical, and more desirable, provided always the entire service would be under the jurisdiction of the Navy Department. It is a fact that at this very moment a desperate attempt is being made by the Navy Department to obtain control of all aviation fields along the coast and of all Aviation necessary for coast defense. The general staff of the Army will concede the same thing, provided, of course, it is placed under the general staff.

The attitude of the general staff is

The Army Blimp C41 landing on plaza of United States Capitol.



Henry Miller Service

perhaps well illustrated by an incident which took place not so very long ago before a sub-committee of the Military Affairs Committee of the House. (Congressman W. Frank James of Michigan, was then chairman of the sub-committee. He is now the Chairman of the Military Affairs Committee. He is well informed on aviation and a real and sincere friend of aviation.) He was examining a certain well-known General. The Congressman was quoting statements from General Mitchell and asking the General's views on these statements. "Ridiculous," "absurd," "impossible" were the General's stock answers to General Mitchell's views. Then the Congressman, who is a very able lawyer, shot in a statement as to the possibility and use of aviation, to the representative of the general staff. The General to climax his characterizations of General Mitchell's views added that this last statement could be only the child of an insane or diseased mind. Imagine the General's chagrin when he was politely but impressively informed that the last conclusion did not happen to be one from General Mitchell, but one uttered by the then Secretary of War while Assistant Secretary when he had not yet come under the hypnotic influence of the old-fashioned general staff.

Yes, millions of dollars will still be wasted and charged to aviation. Not a flyer or an expert on the subject can be found who advised the Navy to squander ninety million dollars ($90,000,000) of the public's money on the U. S. S. Saratoga and the U. S. S. Lexington. Both of these ships were apparently misnamed. They should have been called the U. S. S. Lemon and the U. S. S. Goldbrick. The American people have not yet been told of the uselessness of these two monster ships. Congressman Burton French of Idaho, who is chairman of the sub-committee on naval appropriations, partially opened the bag to let the cat out during the discussion of the last appropriation bill with the statement that in all likelihood the Lexington and the Saratoga would soon be put out of commission. The reason given is that the Navy had "discovered" that it cost too much to keep them in commission. The Congressman was so informed by the Navy. He did not, of course, intend to mislead the House, for he never does. The Navy purposely misled the committee. Of course the Navy knew before these vessels were constructed how large a crew and personnel was required to man them. Of course the Navy knew at the time how much it would cost to operate these ships. The reason is not the cost of operation; the reason is that both of these vessels are too large, and unwieldy too, and cannot be used for the purpose they were intended in actual warfare.

This is a striking example of the necessity of having all aviation matters in the hands of flyers and aviation experts. The Navy with traditional stubbornness insisted upon using these monster ships and building them into plane carriers when every flyer knew that they would not be serviceable for such purposes. Now the Navy has them and is looking for a way out. One suggestion was made recently in a sort of clubby, private hearing, that it might be well to use these two ships down at Panama, one on the Atlantic and one on the Pacific side, stationary. They would serve as aviation bases in lieu of France Field and other fields on the Isthmus. Any such idea is not only useless but impractical. Such an idea would be all right in times of peace but in the event of an attack on the canal the first thing that would be done would be to put these two ships into the safe shelter of some inland harbor and then we would find ourselves without proper and suitable aviation fields to protect the canal. Perhaps the best use for these ships, large, huge, commodious, would be that suggested by an enterprising denizen of Broadway who suggested converting them into floating hotels, anchoring them twelve miles off the coast and operating them as "whoopee" joints.

The appropriations for the government are entirely in the hands of Congress. But naturally in technical matters, committees of Congress will follow the advice of the men who represent the government as experts on these technical subjects. Congress can not be entirely blamed for the mistakes of the past. From now on, however, aviation has developed to such an extent and has demonstrated its possibilities and use so universally that if Congress continues to follow the views of the general staff and the admirals of the Navy, and continues separate services it will be to blame and will be held responsible.

Personally I do not believe that Congress will ever appropriate funds for another battleship; the airplane has made the battleship ineffective. This was definitely demonstrated at the bombing test in 1921 held in Hampton Roads. A few bombing planes, costing only a few thousand dollars, sent out on a war mission, can at will destroy the most perfect battleship on the sea, costing sixty million dollars. The only defense against an air offensive is aviation itself. To date no anti-aircraft gun has been developed to provide adequate defense. It makes good copy and perhaps serves present purposes of the old generals to stage an attack on New York every now and then with blank cartridges in the anti-aircraft guns and no bombs from the planes and then report the large number of "theoretical hits." Planes today can fly over the range of the best anti-aircraft gun, and there can be no doubt in the mind of anyone, except the general staff and the battleship admirals, that any city today is vulnerable unless properly and adequately defended by an air force. As General Mitchell says, "A Navy as the determining element in sea warfare, has lost its occupation." The Navy, however, certainly knows how to get its views across. It is great on publicity. In fact it has specialized in that subject. The Navy is a great advertiser. When it comes to lobbying, the railroads, oil, or the steel trust, have nothing on the Navy.

Aviation has this advantage in the present stage of the art in that each plane that flies can in the event of an emergency be quickly converted into a bomber or observation plane. A country which develops a large commercial aviation industry can in the event of an emergency become quickly prepared, notwithstanding the stubbornness of the general staff and Navy in times of peace.

Congress should do more to encourage and insist on the development of planes and motors. Experimental fields should be provided in every section of the country with available planes to try out any new motors and motors to try out new types of planes. We should not permit the inventive genius of

[*Cont'd on page 88*]

Martin 3 purpose ship, Packard 800 H.P. Engine, dropping torpedo at Guantanamo Bay

THREE OF THE LATEST

Bellanca C H

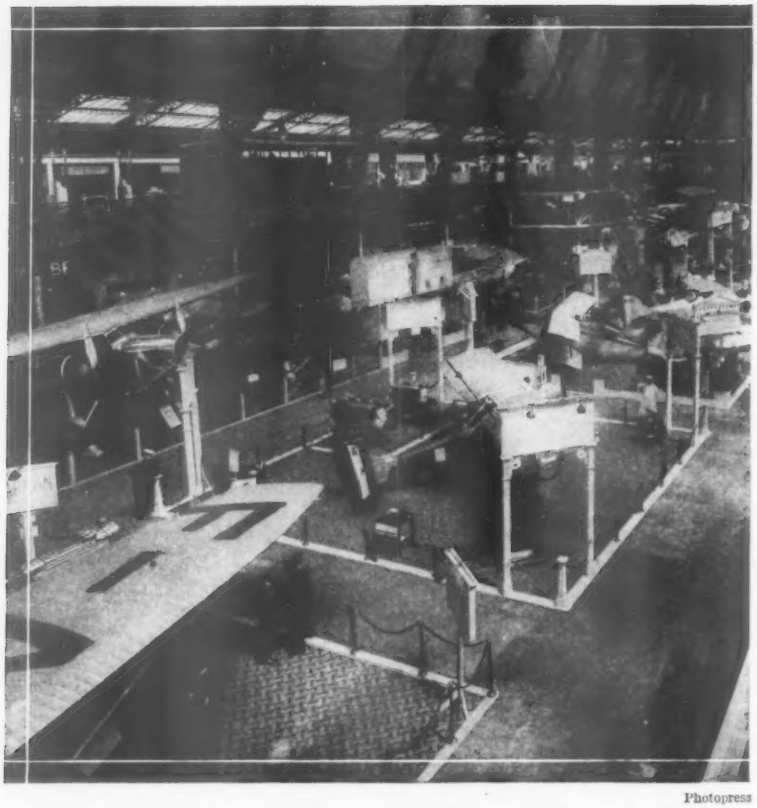
A luxuriously fitted airplane for those who like a medium sized ship. The 300 H.P. Wright J-6 gives the power which enables a cruising speed of 122 miles per hour with engine throttled one third. There is comfortable room for six people and baggage. A service ceiling of 18,000 feet is claimed. Useful load 1,800 lbs. Approved Type Certificate 129.

Crosley Moonbeam

Crosley, already famous to the air through the medium of radio, will ride the skyways in more tangible form in the shape of the new "Crosley Moonbeam" pictured to the left. This three place monoplane is powered with a Warner-Scarab, 110 h.p. seven cylinder engine. The wing spread is 40 feet and the length overall 5 feet 9 inches. An exceptionally quick takeoff and low landing speed is claimed.

Wallace Touroplane

A highwing monoplane built by Wallace Aircraft Co. (recently purchased by American Eagle Aircraft Co.). Has 100 h.p. Kinner engine and carries a payload of 425 lbs. Cruising speed 100 m.p.h. A feature of this plane is the folding wings which enables economical parking in a space of 13 by 25 feet. Designed by Stanley Wallace. Approved Type Certificate No. 119.



Photopress

The LONDON SHOW

by PAUL E. LAMARCHE, JR.

THE Seventh International Aero Exhibition at Olympia in London followed closely after the Royal Air Force Display at Hendon and was formally opened on July 16th by the Prince of Wales, who in the company of the Right Honorable Lord Thomson, C. B. E., D. S. O., Air Minister of England, made an inspection of the Exhibit. The Exhibit, which was under the combined management of the Society of British Aircraft Constructors, Ltd., and the Society of Motor Manufacturers and Traders, Ltd., was the first to be held in London since 1924. It coincided with the twenty-fifth anniversary of the Wright Brothers' first flight, the twentieth anniversary of Blériot's famous flight across the English Channel and the tenth anniversary of the first non-stop flight across the Atlantic, which was accomplished by Alcock and Brown in a Vickers Vimy.

The exhibit had a large international representation, and France, Germany, Italy and the United States exhibited planes while other nations, principally Belgium, Sweden, Austria and Czechoslovakia were represented. America was represented principally by a tri-motor Ford plane which attracted much attention while the British Companies engaged in the production of Irvin and Russell parachutes also exhibited. Of outstanding interest were the Fairey-Napier Mystery plane, the Supermarine S-5 seaplane, winner of the last Schneider Cup Race, the Supermarine Southampton 1149, one of the three all metal flying boats which made the 28,000 mile flight to the Far East under the command of Group Captain Cave-Brown-Cave and the new single seater interceptor fighter, known as the Hawker Hornet.

The Blackburn Exhibit consisted of the completed boat body of the all metal Blackburn Nile, a large tri-motor monoplane flying boat which is designed for service over commercial routes in Africa. Its appointments are very luxurious and when completed it will have accommodations for a crew of three and fourteen passengers as well as freight and baggage. Its maximum cruising radius will be eight hours. The Blackburn Lincock, the Ripon and the Nautilus also were exhibited. Fairey exhibited a number of different military prototypes while Boulton and Paul exhibited their well known Sidestrand Bomber. The Bristol Bulldog created much interest and this firm introduced a new commercial four place

This great show was unfortunately not as well attended as it should have been, showing the advantage of the American method of intensive press-agenting. . . . .

cabin plane at the show for the first time. Gloster was represented by the Gnat-snapper, a small all-metal biplane designed for use on naval vessels as well as their single seater fighter. Handley Page exhibited the cabin of a new commercial four motor biplane which when built will be able to accommodate forty passengers. Two motors will be placed in the upper wing and two in the lower. A military bomber was also exhibited by this firm. Hawker exhibited their prototypes known as the Hart, the new Hornet and the Tomtitt, a training plane.

Parnall had possibly one of the most interesting exhibits among the smaller planes. The Parnall Elf is a new light plane built around the Cirrus motor and was introduced for the first time this year. The Parnall Peto is their latest product and is a small and compactly built seaplane intended for use on submarines. This little plane when folded has a maximum width of eight feet including the two pontoons and has many interesting features too detailed to describe here. It is powered with a 135 H.P. Mongoose air cooled motor built by Armstrong Siddeley and has a speed of 113 m.p.h. A. V. Roe showed their well known Avian light planes as well as several Fokker tri-motor planes built under license and known as the Avro 10 and the Avro 5. De Havilland exhibited their new cabin light plane known as the Hawk Moth, as well as the well known Moth. Perhaps one of the largest planes exhibited completely assembled was a Vickers Victoria, a twin motor 24 seater troop carrier. This well known house also exhibited a new interceptor fighter known as the Vickers 151 and which is a low wing single seater powered by a Bristol Mercurey 500 H.P. Motor.

Westland exhibited their Wapiti, a military plane, the Widgeon, a light parasol monoplane, and their new Limousine which is a tri-motor cabin monoplane for four passengers and powered with Cirrus motors. The Autogiro of Senor de la Cierva with several important improvements was exhibited under the designation of type C-19. Among new light planes was the A.B.C. Robin, a very small cabin monoplane, and the new Glenny and Henderson Gadfly, a small low wing single seater powered with a 30 H.P. air cooled motor. Other light planes exhibited were the Blackburn Bluebird, the Spartan, the Desoutter Sports Coupé, the Gloster Gannet and the Short Mussel which is designed for the water. The Saunders Cutty Sark was always surrounded by a number of interested spectators. This plane is an all metal monoplane flying boat powered by two Cirrus motors mounted over the wing. It is designed for private ownership and accommodates four.

Among interesting foreign planes exhibited were the new Junkers Junior, a two place all metal low wing light plane, the Klemm, the B.F.W., both light planes and the large Heinkel seaplane which were exhibited by German builders. Italy had three interesting light planes exhibited, the Breda, the Romeo, and the Fiat. France exhibited a new Potez light cabin plane as well as several of the smaller types of Farman planes, one of which was the new Farman F-200, a light monoplane which has created much interest. A Lioré et Olivier monoplane flying boat with a motor of small power mounted over the wing was also exhibited.

An interesting feature noticed on many of the new military planes was the Townend Ring which is placed over air cooled motors to reduce head on resistance. The Bristol exhibit had one of the new American N.A.C.A. cowlings mounted over a motor on a framework. Armstrong Siddeley presented their new Leopard motor which is an air cooled motor of 800 H. P. Sunbeam presented a motor that created considerable interest among air technicians. This new motor is known as the Sunbeam-Coatelen Type P-1 and is a compression ignition engine based on the Diesel principle which makes use of heavy oil. It is a motor of six cylinders in line and develops 100 H.P. at 1500 revolutions while its fuel consumption is 5 gallons of crude oil an hour. The Redrup Axial engine which is a multi-cylinder, single crank motor of new design was also of much interest to engineers.

[Continued on page 76]

AERO FASHIONS

THE CORRECT MODE FOR AIR TRAVEL

Modern wear demands a special costume when traveling. The proper mode for the air allows the utmost in simplicity and follows the modern trend towards straight line and block formation ▲ ▲

With acknowledgement to Chas. A. Stevens & Bros. and S. Y. Hasvold, Northwest Airways, Inc.

Miss Peggy Davidson, wearing a beautiful yellow and brown ensemble, the Lanvin model, with a chestnut and brown hat designed by Marcelle Lely, and carrying a light brown pig-skin traveling bag

Martha Burns of Stevens with a Molyneux Wine-colored suit with a badger collar and a soleil black felt hat with wooden beads to match the suit

Miss Harriet Smith in green tweed suit trimmed in gray caracul with a matching hat, and Olivetta Millekin in a light weight ribbed tweed dress designed by Chanel wearing a sport beige Lapin coat and a brown felt Valois hat

Aeronautic Law

by Bailey Samelow

Bailey Samelow of the Chicago Bar recently returned from an extended tour of the principal European countries, where he made a study of aeronautic law interpretations.

Continued from Introductory Discussion in the September issue of AERONAUTICS

NOW as to the case of "X" who concealed himself as a stowaway in an aeroplane bound on a trans-Atlantic flight from the United States. The weight of "X", for which no allowance was made, was a dangerous excess, dangerous to the point of jeopardizing the craft and the safety of the crew and owner.

"X" in this case is a trespasser. He has wilfully violated the personal and property rights of the owner and crew of the aeroplane. He stealthily entered and took possession of extremely valuable space—space perhaps equal in value to the lives of the owner and the crew of the craft. It would have been equal in value to the lives of these men if his excess weight would have caused their sinking or destruction—popularly speaking, in that case his presence in the boat cost their lives.

Now, granting that he is a trespasser and supposing that the owner of the craft genuinely found it necessary, to save the lives of himself and his crew, to throw the transgressor overboard, and threw the stowaway overboard, would such an act constitute a crime, the men contending that not only did discretion dictate the commission, but that necessity required it?

The fact is, there is no law that would apply directly to such a case—it is a new case so far as the law is concerned. The big argument the defense lawyer would raise would be that the act was committed in the air—let us say beyond the "three mile limit"—a new realm not subject to any existing laws. The "State" would endeavor to apply the laws of the land to the case. They would contend that modern law repudiates the maxim that "necessity knows no law."* They would quote the Holmes case (26 Fed. Cas. No. 15,383), which is as follows:

The American ship, William Brown, left Liverpool on the 13th of March, 1841, bound for Philadelphia. On the night of April 19th, when about 250 miles miles S.E. of Cape Grace, Newfoundland, the vessel struck an iceberg and it was evident that she must soon go down. Amongst the life boats lowered was one known as the "long-boat," containing the first mate, eight seamen and thirty-two passengers. As soon as the lifeboat was launched it began to leak and continued to leak the whole time, but the passengers had buckets and tins and by bailing were able to reduce the water so as to make her hold her own, altho she was in great jeopardy. The gunwale was within from five to twelve inches of the water and it was the opinion of the Captain of the ship and his second mate, who had followed the sea for twenty-one years, that even without a leak the long-boat would not have supported one-half her company had there been a "moderate blow," and that the chances of the long-boat being picked up were ninety-nine to one against it. The people were half naked and were all crowded together like sheep in a pen and the slightest irregularity in the stowage would have capsized the long-boat.

Notwithstanding all this, the long-boat survived throughout the night of Monday, the day of Tuesday and until ten o'clock of Tuesday night—full 24 hours after the ship struck the iceberg. The crew rowed turn-about at intervals and the passengers bailed. On Tuesday morning it began to rain and continued to rain throughout the day and night of Tuesday. At night the wind began to freshen, the sea grew heavier and the waves splashed so as to wet all over the passengers who were seated there. Pieces of ice were still floating around and during the day icebergs had been seen. About ten o'clock Tuesday night the defendant Holmes, who was the first mate of the ship and in charge of the long-boat, together with the rest of the crew, began to throw over some of the passengers. It did not cease until they had thrown over fourteen male passengers, which constituted all of the male passengers aboard with the exception of two married men and a small boy. Not one of the crew was cast over. On Wednesday morning the water cleared and early in the morning the long-boat was picked up by the ship "Crescent" and all persons who were not thrown overboard were saved.

The defendant was indicted on a charge of unlawful homicide of one of the men thrown overboard and defended on the ground that the homicide was necessary for self preservation. The defendant was found guilty and sentenced to solitary confinement at hard labor in the Eastern Penitentiary of Pennsylvania for a term of six months and to pay a fine of $20.00, the penalty being lightened in view of the heroism of the defendant in saving the lives of persons on the sinking vessel and because of the fact that he had been confined in jail several months. This penalty, however, was subsequently remitted because of efforts made by the Seamen's Friend Society.

Circuit Justice Baldwin, in his charge to the jury, among other things said:

> "Whether or not 'a case of necessity' has arisen, or whether the law under which death has been inflicted has been so exercised as to hold the executioner harmless, cannot depend on his own opinion; for no man may pass upon his own conduct when it concerns the rights and especially when it affects the lives of others."

In replying to defendant's counsel's motion for arrest of judgment on the ground that the act of the defendant was "one of necessity," referred to by the defendant's counsel as "the law of nature," the Court stated:

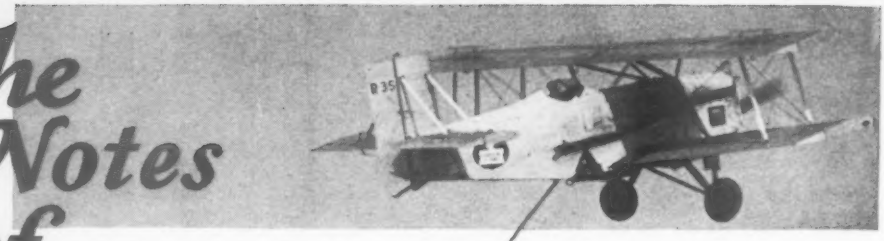
> "It is true that we do find in text

[*Continued on page 76*]

* *Attributed to the old Roman scholar, Publius Syrus.*

XUM

The Notes of TWO TOUGH



An Intimate Historical Record of 246 Hours in the Air

TWO tough hombres (self admitted) cramped in the small quarters of their Buhl biplane, the *Angeleno,* outrode fog and bumpy air in a small area west of Los Angeles to establish a duration refueling record which prior to the flight of the Army's *Question Mark* would have been thought impossible. Although this epochal flight has been eclipsed by the recent extended jaunt of the St. Louis *Robin,* it remains a noteworthy and spectacular performance—a real landmark in aerial progress.

Considerable newspaper space has been devoted to the fact that both plane and power slant were "second hand." They were, but it is worth noting that the engine which had already shown 450 hours, was completely rebuilt under supervision of W. E. Thomas, Western distributor for the Wright Corporation.

The gallant ship, with its crew, Loren Mendell and Roland Reinhart, came down to a perfect three point landing after sustained flight of 246 hours, 43 minutes and 32 seconds.

Here are presented the notes sent down by the flyers. They give the "feel" of the flight more competently than any mere description.

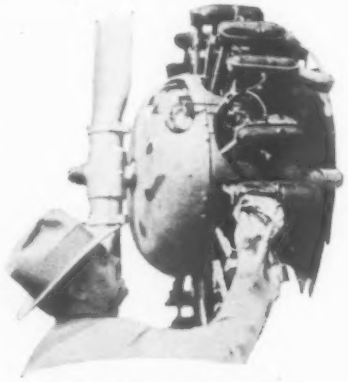
The first two were written by E. E. McManus, field manager of the Culver City Airport—the others fluttered from the grimy hands of Pete and Loren. *

Tuesday, July 2—afternoon contact

HELLO BOYS:—How are things going? Paul and I spent the morning collecting things to fix up the Pigeon and while we are in better shape than yesterday we have lots to do. The papers have been calling up all morning and one of the Associated Press wanted a 200 word story by Reinhart for use on the coast. I told them I didn't know at this time whether we could let them have it or not but write it anyway, Pete, and we'll see what happens. You didn't date the note you dropped this morning. Wish you would so that if they are lost we will be able to keep them in order when they are found. We are numbering them as they come in.

INSTRUCTION: When Slade lowers the contact line he will next lower food or oil on the second length of rope. You can bring it in with the first line. Unload it and then fasten on to the rope whatever you want to return (food, cans, etc.) and let Slade pull the bag back into the Pigeon. BUT KEEP YOUR LINE FASTENED so that he can use it to give you the gas hose. After gassing you can drop the plumb or first line on to the field so we can use it on next contact.

Follow Paul's instructions on morning contact. Best of luck. MAC.



"Tommy" Thomas, coast representative of the Wright Aero Corp., inspects the rocker arms of the *Angeleno* 15 minutes after landing and pronounces them in perfect condition

Wednesday morning

How do you like these nice clear mornings? Hope everything is O.K. Let me know the first note you drop. The papers want everything they can get so write anything of interest that happens. New signals from the ground: Coming up to refuel you so stand by to get filled up. T on ground will point towards the place where the Pigeon was last seen. This is not the wind T but the one we are using in front of the hangars.

Had a man working all night on the Pigeon motor and he found plenty wrong but guess everything will be O.K. from now on. Will send up the papers and a note from Loren's girl when we contact for breakfast. Pacific Air Transport called up during the night telling us they were leaving their boundary, beacon, and landing lights on for you. Drop them a "thank you" note and we'll send it over to them. Thank Van Dusen for the dinner. Everybody is pulling for you and think you can make it. THE FIRST THREE DAYS ARE THE WORST. Give my best to any gulls or night owls you meet and keep going.

Best of luck. MAC.

* These, of course, are greatly deleted for want of space. Only those of specific interest are published.

Only one more routine message followed, before the two young pilots descended, happy in the knowledge that they had added something of material importance to the game they loved.

H HOMBRES

July 2—5:05 p. m.

Hey—Send up 150 gal. about 7:15 tonight—don't think we got very much of the last—Loren wants to know if the beacon will be on tonight. Will fly from the University City sign over our field to Lincoln Airways field. Have Slade nod his head if a light and shake it if not. P. S.—Was the Jap sore about the rope?

LOREN AND PETE.

P. S.—Motor like a clock.

6:30 a. m.

Must have gas in the next 15 minutes. Contact above field, fog not very thick. Bring us two gal. water later on.

6:37 a. m.

Bring up 2 gal. water. Hell, we're dying of thirst.

7:30 a. m.

Mac—Send up some water in the monocoupe. We haven't had water since 12 last night. Thanks for the quick service. Our tanks weren't full last night. We thought they were. Oh, boy! She sure was hot up here last night.

(untimed)

We are O.K.—a little tired. The fog raised hell with us. The Pacific air turned on their beacon at 2. Send up 125 gal. gas in about 30 min. or so.

Motor running fine. Turning 1600 most of the time. I ordered a bottle of Syrup Pepsin yesterday, it wasn't sent up. Wish you'd see to it for me. Every time you let something down in a sack send a gallon of water. We ran out at 11 last night and like to have died before this morning. We'd rather have water than food. The coupe is the hot stuff for contact. (*Food was delivered frequently from a Monocoupe.*)

June 3, 9:30 a. m.

Thanks for the quick service this morning. It was a close call. We didn't have as much gas last night as we thought we had and I never saw such a thick fog in all my life as it was this morning. Say, canny Scot, we don't want any more second hand batteries; no light at all last night, only for 30 minutes. Wish you'd have a white band to place in front of the Pigeon about 5 minutes before it takes off so I will know and not miss it. I almost missed it last night. Please watch that. We want a full load of gas tonight, no more chances like that for me.

June 3, 3 p. m.

Van Dusen Drug Co.—Thanks a lot for your splendid service; everything is good; sure do like the orange juice. Send more.

(*Same time*)

Pacific Air Transport—Thanks a lot for the beacon. Would appreciate it if you could leave it on each night; it is a great help.

(*5 minutes later*)

Mac—Your note about the gas; I will have to have more than that; what I now have will only run me until about 5 p. m. and I'd like to have full tanks to start the night with. If you could bring up 125 gal. each time that would be O.K. but bring whatever you can; if we have to make three contacts we can; however, I think you could bring 100 one time and 125 another and that would be enough. Don't forget to send up the batteries for lights and some orange juice, but no solid foods: drinks seem better. I have been sick all day but feel better now. The coupe is O.K. for sacks; don't send any oil until morning; we have enough. Send some "Lucky Strikes" for Pete.

---

5 p. m.

Tell Paul to throttle down a little more on contact. Both main tanks and wing tanks are full now; no more oil until tomorrow a. m.; motor like a clock, plugs O.K. Wish this fog and rough air would let up. Loren and I both sicker'n'ell.

6:30 p. m.

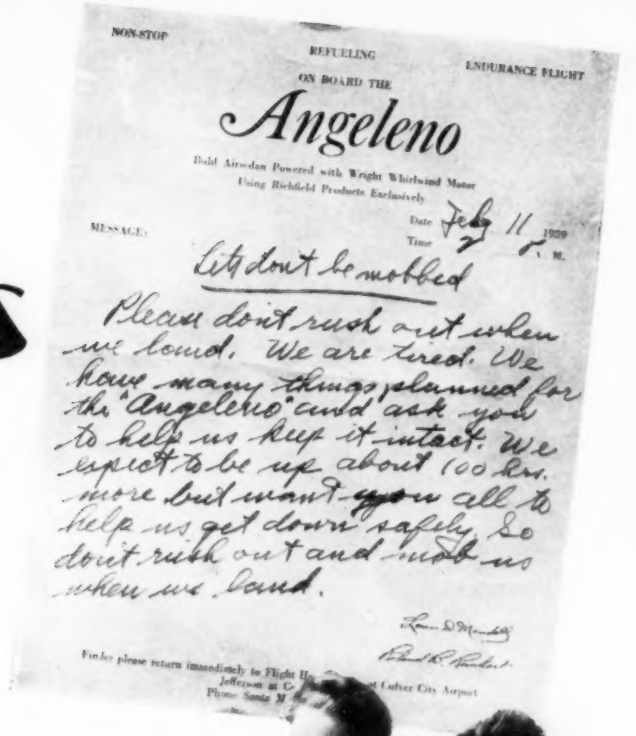
Bring up 50 at 7 p. m. Stay east out of fog. Bring batteries for navigation lights—get regular hot shots. Those last night burned nearly an hour; after that we were dark. Thanks for fags and thank Ruth and Jane for the cake.

July 4, 7:25 a. m.

Bring up 100 gal. gas 1 hour from time; contact between field and Mt. Wilson. Fog about 800 feet thick. Contact you above fog. Engine O.K.; both tired but feeling better. One hundred ft. ceiling now if it raises to 1500 we will contact under fog.

(*By this time the fliers apparently had lost all idea of time, for the next and longest message was dated June 4. It was dropped at 2 p. m. on July 4.*)

Hello, Gang:—Well, all is O.K. Today is the first that Pete and myself have felt like anything. We feel good now and eat some for the first time since being up. We have felt bad but seems as the old Whirlwind kind of likes it. It's been purring to us just like an old Tom cat ever since we have been up and I hope it continues to do so for 400 hrs., and it sure likes the taste of gas and oil. The old Buhl is O.K., only it's lazy; don't like to get up so high; does pretty well to 2,000 ft.,


NON-STOP
REFUELING
ENDURANCE FLIGHT
ON BOARD THE
Angeleno
Buhl Airsedan Powered with Wright Whirlwind Motor
Using Richfield Products Exclusively
MESSAGE:
Date Feb 11 1929
Time 7 P. M.
Let's don't be mobbed
Please don't rush out when we land. We are tired. We have many things planned for the "Angeleno" and ask you to help us keep it intact. We expect to be up about 100 hrs. more but want you all to help us get down safely. So don't rush out and mob us when we land.
Finder please return immediately to Flight H
Jefferson at C
Culver City Airport
Phone: Santa M

Wide World

The note thrown the day before landing. Pete, center—Loren, right

then gets cranky. Tell the boys I am sorry about the sack this morning but the reason I couldn't make contact was because it was hanging down and I was afraid of getting it in the prop or tail group. Always let me get in position before letting it down. The coupe is O.K. for transfer if they will remember this. Tell Paul his speed is fine, just right. That seems to be the most important thing in airplane hosing.

Order same weather without fog. Had to fly 3 hrs. blind last night and it is not too good a feeling to have to plane down through it in the mornings. Too many mountains. We want to thank all for their kindness and for your extreme confidence in us two poor old reprobates. It's great to have such friends and we'll not forget. Send up 1 hr. after this is dropped, 125 gal. gas and then at 7 p. m. 125 more. We carry enough for 14 hours when full. Don't think our capacity is as much as we figured. We are using around 16 gal. per hour. Send up 2 gal. oil, 2 gal. water; we have 3 gal. oil left. Send up map of California and some more newspapers; guess that is all. Thanks.

July 4, 3:30 p. m.

Everything fine here except fog at night; damn poor stuff to fly in if you ask me. Both feeling much better. Let Loren ask for food and gas otherwise it doesn't give us an opportunity for rest in the evening and makes us sleepy and tired for the night. Both of us dozed off last night. Hope you have the Buhl insured. Love and kisses.

July 4, 5:30 p. m.

Bring up 50 at 7:15 . . . with all tanks full we have enough for 14 hrs.; must contact by 9:30 a. m. at latest. Will contact for 10 minutes for radio; is there any money in it? Our radio won't work. Lights shorted somewhere, need battery tomorrow. Paul, fly a little lower on this contact, due to heavy load.

July 5, 7 a. m.

Good morning, everybody. We are fine, all O.K. Had a nice night, rested well and old Whirlwind did her stuff . . . also advise if Cleveland fliers are still up and if so how long.

8:30 a. m.

Good morning, gang. God bless you! Send up some rags, too; not too many. All's well, both feeling fine—had a good night. Think the worst part over physically. Motor good. Plugs O.K. Lubricating system O.K. Loren says wait till 9:30 to make contact, thinks it will be clear by then.

Beginning to have hopes of success now.

Had bum air for a while, couldn't get over 1,000 ft. for hell.

---

1 p. m.

Well, all is well so far. We both feel good and can eat some. I think that was the first time in my life I ever lost my appetite. Looks like the Cleveland fliers will get there first. Well, hope they don't set it too high. As to gas, there is only one way to do it right and that is to bring it up as we order it, otherwise we are flying around with a damn lot of extra weight. We have to fly almost wide open at night but this can't be helped of course. That gets my goat about the D of C. We have never flown over town at all except when it was foggy the other morning and I couldn't have helped that if they was to cut my head off. Wish you'd explain to them that I am not trying to break any regulations at all, and it was only in case of emergency that I flew over town at all. Send up another can of rocker arm grease today.

5:30 p. m.

Paul, you'll have to fly just a little slower. You pull away from us all the time. Loren says if you do settle a bit, it won't hurt. We were wide open and you were still too fast. Coffee, orange juice, sandwiches.

9:40 p. m.

Just heard over radio that Cleveland fliers have broken record. Wire them our congratulations.

July 6, 6:50 a. m.

If we get 110 gal. each time we'll only have to make three contacts a day . . . as to food, only send us a little coffee and about 8 sandwiches a day . . . we have so little room here that with so much stuff we have little room to sleep or even to stretch out.

July 6, 1 p. m.—At the time of the flight of the "Question Mark" the uppermost question in the minds of the people was whether it was an endurance of the plane or the men. . . . After passing the 100 hour mark in the air it is our belief that it is not a test of men's endurance providing they have made ample preparations for comfortable rest. Outside of our digestive system we have felt normal. In fact after having become used to the grind we feel better than before the start because then we were working almost night and day preparing for the flight. The test of the motor is to the extremes they must run constantly and without alteration to adjustments, as a motor flying three or four hours at a time would have. My first impressions were that time would drag very slowly but we find time seems to fly. We sleep a while on a comfortable bed we have and fly a while. We do not like the foggy weather. The first two nights were awful. We had to get above the fog and fly blind, or in other words without any landmarks. It was on one of these mornings that I came through the fog where I thought I would be over the ocean, but instead I came out in the center of Hollywood some 200 feet above the town and had to fall back into the fog to keep from hitting the mountain. I was low on gas and knew that I must reach the field and order gas or crack up, so I flew low over town staying under the fog. . . . We were lucky and reached the field and dropped a note telling of our plight. Pilot Durfee came up in a small ship through the fog and delivered us five gallons in a can, enough to last until the refueling ship came up.

As to time, we found that circling a spot is better than taking trips to places because in going to San Diego or elsewhere one keeps his mind on getting there and as a result watching your watch. In keeping close to the field one forgets all this. We hope to stay up until our motor stops and we hope this happens in the day time after we have put several hours onto the present record.

Date: "Aw Hell, I forget."

4:25 p. m.

Bring ½ gal. coal oil and squirt can in the morning. Both of us feel fine, got used to it now—we will stay as long as the engine does; might drop a grapefruit in the morning and a sandwich or two.

OK—MNX.

Sunday, July 7—7:45 a. m.

. . . We have only 1½ hrs. gas left; don't be too long. Do not send any oil—all O.K. If you can stretch that gas to 110 gallons, three contacts is all we will have to make a day.

---

2 p. m.

With a full load we have got to run it most wide open for 3 or 4 hrs., so stand by early in the morning for refueling. Do not bring any more than I have ordered . . . and how about that coal oil we ordered yesterday. A valve stuck for a while and we didn't have anything to loosen it up with. (Paul, you are a real Pigeon flyer—keep it up!) I will write those letters as soon as I can find time. We don't have as much extra time as you'd think for.

Note—No notes of consequence were dropped on the eighth. The fliers made routine requests for fuel.

June 9—2 p. m.

. . . I think it would be a good idea to have a signal system (for refueling) like Pete and I do. I tie a rope around my leg. He takes the other end and when he gives me one pull that means to go ahead a little faster; two jerks to back up; three when he contacts, and a quick succession to pull away. You'd be surprised at how it works. The day we got the hose too close to the prop I forgot to tie the rope on my leg and that was what happened. So if you had a rope down to Slade he could signal you to slow down. It won't hurt if you do settle some. I'll keep out of your way . . . if you could have Slade let you know you could throttle some, and as your load is partly gone you would not settle.

3:30 p. m.

Send us a quart of rubbing alcohol. Send me up a $1.50 watch. Mine went haywire. Set it right time. Motor running like a clock now.

July 10—5:15 a. m.

At 6:45 deliver me some gas and 5 gal. oil.

---

3 p. m.

To the Baldwin Locomotive Works
and Mack Truck Co.

Dear Madam:

I am writing you this letter in appreciation of the great service rendered us by one of your 1742 model pigeons. If it had six more Libertys it could get off with 50 gallons of gasoline. I am not boasting for what it does but for what it tries to do. It snorts, groans and puffs and that's all the Texas steer could do.

Its take off is remarkable. That is, it is remarkable if it takes off. Pigeon Pilot Paul Whittier in one tried to take off in a short field five miles long and almost got over a three-wire fence.

And I can safely say in closing that I am sure there would be more of them in use if they could get high enough to pass the Department of Commerce rules for low flying.

I wish to state that the rust proof steel plating has only rusted half way through in all these years of service. Hoping you can build better barns in the future, I am,

Disgustedly yours,

---

5 p. m.

Say listen—Once and for all, confound it, it took us a week to get up to this point and if you think we're coming down today, you're crazy. And that's not all—we're two tough hombres. Don't worry about us before you have to.

[*Continued on page 78*]

IN THE FLOODLIGHT

A monthly review of a few of those who have recently added luster to their names

Underwood & Underwood

HERR HUGO ECKENER, Minister extraordinary from the German republic who has ruined recent water hop records for craft of all types

Underwood & Underwood

M. LOUIS BLERIOT who flew the channel twenty years ago, does it again to attend London fete in his honor. Picture shows him being welcomed on landing

LAWRENCE V. KERBER who was recently elected President of the Spartan Aircraft Co.

Underwood & Underwood

LIEUT. ALFORD WILLIAMS who was to have been America's entrant in the Schneider Cup races at Cowes, England. It is reported that he helped finance the building of his beautiful blue and copper colored racer, THE MERCURY

This man FLEET

by

HELEN K. SCHUNCK

Blank-Stoller

Reuben Hollis Fleet

THERE is one man in aeronautics whose surname, according to Funk & Wagnalls' "Practical Standard Dictionary," means — "Rapid, nimble, swift"; or, "to fly swiftly"; and there is one man whose personality those very words conjure up: Reuben Hollis Fleet, President of the Consolidated Aircraft Corporation, Buffalo, New York.

Fleet is a dynamic person; one never forgets him. He is restless, untiring; one whose nature demands activity; a man made for accomplishment and success. Failure is a word he does not recognize; a fight cannot last long enough to exhaust him; he is victorious a goodly portion of the time because of his will to win. He overpowers his adversary by his sheer force of will, and wears him out with his insistence. That is why McCook Field always sent Major Fleet to Washington when promotions were in order. The Air Service was known for its stringent methods regarding salaries, and the story goes that Fleet's success in bringing back an approved list of raises was due to his getting the man with the deciding voice, blocking his way by sitting directly in front of him, and then talking him into submission.

Fleet is a pilot, of course. His connection with aviation dates back to March, 1917, when he became a student at San Diego. His assignments in the Air Service were varied, and his record always brilliant. "Who's Who in American Aeronautics" gives the following regarding his career:

"Born, Montesano, Washington, March 6, 1887; Culver Military Academy.

"Aeronautical Activities and War Service: Student, Air Service Signal Corps, San Diego, California, March 31 to September 10, 1917; O. C. Machine Shops, S. C. A. S., September 10, 1917 to January 3, 1918; Assistant Executive Office, Chief of Training, O. D. M. A., January 9 to May 30, 1918; O.C., Training Aerial Observers and Army Corps pilots; O.C., Air Mail Inauguration; Flying Course, Brooks Field, June 2 to June 18, 1918; O.C., Flying, Mather Field, June 20 to September 20, 1918; O. C. Experimental Test Flying, Wilbur Wright Field, September 23 to 28, 1918; on Board of Officers, Standardizing Training Course, September 29 to October 15, 1918; Special Mission Investigating Training Abroad, October 17 to December 21, 1918; graduate, School of Advanced Flying for Instructors, Gosport, England; Office of the Chief of Air Service, December 21 to January 23, 1919; Contracting Officer, Air Service Engineering Division, January 25, 1919 to November 30, 1922; General Manager, Galluadet Aircraft Corporation, December 1, 1922 to April 30, 1923; President and General Manager, Consolidated Aircraft Corporation, May 29, 1923, to date. . . . ."

My own acquaintance with this picturesque personage of aviation dates back to 1918, when Major Fleet was Contracting Officer for the Air Service. That was a man sized job! Its duties consisted of purchasing all the airplanes, engines, and aviation accessories used by the entire Air Service (now it's the "Air Corps"). The man in charge had, first of all, to be absolutely aboveboard, one whose integrity could not be questioned, for certainly if there was a chance for graft anywhere in the Service it was here. Next, he had to be a good horse-trader; he had to make every dollar go as far as

[*Continued on page 93*]

* Little Miss Schunck, former able and efficient secretary to that giant figure in aviation, Anthony Fokker, was in an enviable position to know intelligently the personalities she writes so understandingly about.

Aerial NAVIGATION

by Cdr. Douglas G. Jeffrey, R. N.

(Continued from September issue)

"MANY INVENTIONS"
V

"Many prominent aeronautical authorities are agreed that in the future the navigator will be in complete charge of the ships of the air and the most important officer of the crew. The pilot will perform the mechanical operations of the flight but upon the navigator who need not necessarily be a pilot will rest the responsibility for the safety of the ship and its load."
(LT. COMMANDER P. P. H. WEEMS, U. S. N.)

THE principles of the position line and the methods of calculating them have been dealt with in previous articles. "Many Inventions" have appeared with the object of eliminating the use of logarithmic and other tables; but no one up to date has produced either a mechanical or graphical method that will work with the degree of accuracy required by marine navigators. This does not mean, however, that these inventions are not suitable for air navigation—In fact everything points to the evolution of new "reduction" methods for the air, less tedious, possibly a little less accurate, but more speedy. Known methods may be divided as follows:—Logarithmic or other tables, calculating machine (i.e. special forms of slide rule, etc.) and graphical methods employing curves, etc.

The chief objection to the first method for aerial needs is the bulkiness of the tables used, due largely to the fact that, designed for marine use, they produce a degree of accuracy not altogether necessary in aerial navigation. Less elaborate editions of marine tables have been prepared for use in the air; but it is probable that mechanical and graphical methods will have a greater appeal to the modern pilot.

Method No. 1 is invariably used by seamen, it is mathematical and somewhat tiresome—just undiluted spherical trigonometry. The formulae are given below (Fig. 1) and all our "inventions" are based on them.

(1) $\cos Z = \cos c, \cos p + \sin c, \sin p \cos t$

(2) $\frac{\sin A}{\sin p} = \frac{\sin t}{\sin z}$

or in Haversine form as

$\text{Hav } Z = \text{Hav}(c \circ\circ P) + \text{Hav } t\ [\text{hav}(c+p) - \text{Hav}(c \circ\circ P)]$

The latter haversine form should be noted as the d'Ocagne Nomogram, which

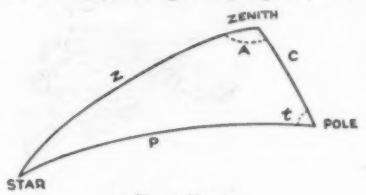


Figure No. 1

we shall meet later on, is based on it. Readers who wish to follow up the logarithmic methods as a pastime will find a very lucid and concise description of them in "Air Navigation" by H. E. Wimperis (of the Air Navigation Research Section of the British Air Ministry).

Lt. Commander Weems U.S.N. it is, I believe, who claims "that anyone who can add and subtract" can use his system. So let us get to the simpler graphic and mechanical methods.

Graphic Methods

The d'Ocagne Nomogram (Fig. 2) is probably one of the easiest of the graphic methods; but its degree of accuracy is only about seven minute of arc—hardly sufficient. The nomogram is made about 15 inches by 15 inches to ensure even this degree of proficiency. To increase its accuracy it would be necessary to enlarge it beyond practical limits. The following description of how to use the nomogram is taken from Wimperis:—

"(a) Enter scale L with the sum of the latitude of the D.R. position and the declination. Enter scale R with the difference of latitude and the declination and join these two points with a straight line. Enter scale T with the hour angle in degrees (or along the base for hours and minutes) and drop a vertical to this line; run across from the intersection point to the scale R, and read off the Zenith Distance and so obtain the calculated altitude for the D.R. position.

(b) Next enter scale L with sum of the latitude and the altitude just obtained, and scale R with the difference of these two; join the two points by a straight line. Enter scale R with the co-declination and draw a horizontal line from this point. At the intersection raise a vertical and on scale T read off the calculated azimuth (E of N) corresponding to the D.R. position." These two operations give you all the necessary information for drawing the position line. This method is not a great time saver—but for those who dislike actual calculations, however small, it may offer an alternative; altho in the writer's opinion

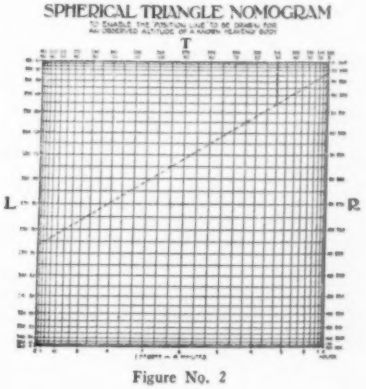


Figure No. 2

it does not give a sufficient degree of accuracy.

Of course the simplest way of solving these navigational spherical triangles would be on a globe, graduated with me-

ridians and parallels to the necessary degree of accuracy. Commander Veater, Royal Navy, acting on this principle produced what is now known as Veater's Diagram. Fig. No. 3 shows a sphere gradu-

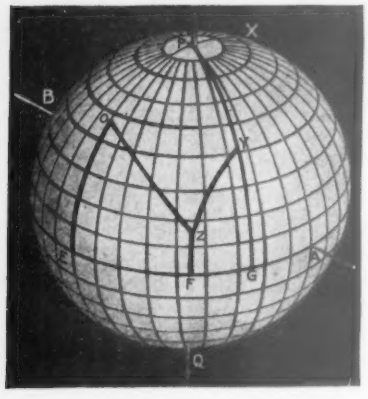
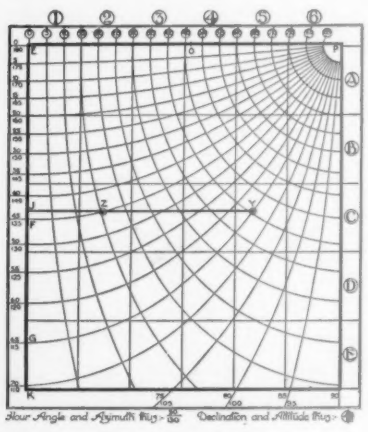


Figure No. 3

ated to each ten degrees. O is the observer's position. E P the observer's meridian, E O Dead Reckoning Latitude, Z the geographical position of the observed heavenly body, E P F is the hour angle, and F Z the declination. All that is required now is to measure O Z zenith distance and the azimuth angle E O Z. As is clearly demonstrated in Fig. 3 the graduation of the whole globe being symmetrical any problem could be worked out on the octant (E P A) shown.

The use of such an octant would be inconvenient and Veater reproduced this octant on Mercators scale *using the Observer's meridian as the Equator*. This Mercator version of the octant would have to be very large in order to solve spherical triangles with sufficient accuracy—in fact too large for handy use. To overcome this difficulty the octant was divided up into sheets of handy size. Fig. 4 is a reproduction of Veater's Diagram (of complete octant) which is used as a key in deciding which particular sheet is required. The actual operation



No. 4—Veater Diagram

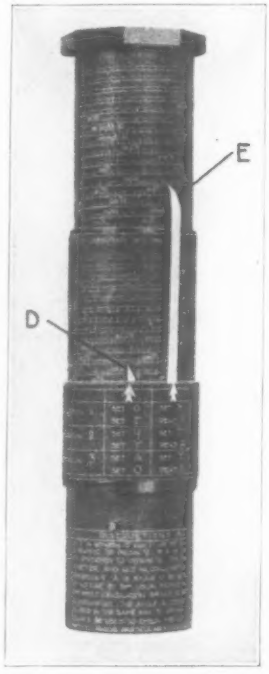
of this diagram is simple and rules covering all possible cases are supplied with it.

While studying graphic methods the Star Altitude Curves introduced by Lt. Commander Weems must not be forgotten. These curves are in reality lines of position laid down on a Mercator chart for every altitude of chosen celestial bodies, corresponding to the latitude and local sidereal time (Fig. 5). The Weems system allows of a very rapid reduction of observations with an average error of two to three miles.

Mechanical Methods

MANY attempts have been made to evolve logarithmic slide rules for navigational work. Most of these rules have been based on the haversine and cosine formulae and rules have been constructed that were capable of obtaining the altitude from Latitude, Declination, and Hour Angle without any intermediate figuring. It has, however, been found difficult to obtain a high degree of accuracy owing to the comparative shortness of any one scale.

Fig. 6 shows the Bygrave Slide Rule based on the simple spherical triangle formulae and capable of a comparatively high degree of accuracy. The formula used makes the notation of an intermedi-



No. 6—Bygrave Spherical Triangle Slide Rule

ate result necessary; but the operation is quick and simple and compares very favorably with any similar methods in use.

Fig. 7 explains the method of dividing up the triangle to be solved into two right angled triangles. O being the position of the observer and Z the geographical position of the observed body. The bases of the two right angled triangles are (90°—y) and (90°—Y) and (90°—y)+(90°—Y) is equal to the colatitude. The following formula then

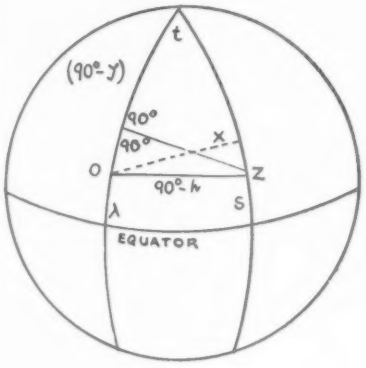


Figure No. 7

connects the parts:

(1) $\tan y = \frac{\tan \delta}{\cos t}$

2a. if λ and δ are same name $Y = y + 90° - \lambda$

2b. if λ and δ are opposite $(Y = 90° - (y + \lambda)$

3. $\tan A = \frac{\cos y \tan t}{\cos Y}$

4. $\tan h = \cos A \tan Y$

The ordinary procedure for determining of azimuth and altitude and the plotting of the position line, using the Bygrave Rule, is as follows: "With pointers in zero position, turn the inner cylinder until the declination is opposite E; move the ring until D is set on the hour angle and read y at E. If declination and latitude are the same name, add 90 to y and subtract latitude to obtain Y, or if latitude and declination are opposite names add latitude to y and subtract from 90 to obtain Y.

Set D to y, turn cylinder until hour angle is at E, set D to Y and read

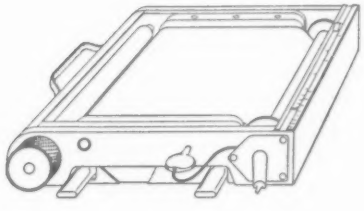


Figure No. 8

azimuth at E.

Set D to azimuth, turn inner cylinder until Y is at E, move pointers back to zero position and read altitude at E. The complete operation takes but a few minutes and is accurate to *one minute of arc.*

[*Continued on page 80*]

The Diesel Engine

A Continuation of the Very Valuable Paper on This New Development, Printed in Last Month's Issue.

by W. G. MYERS

NOW as regards the principle upon which the future type of engine will work, or in other words, the kind of cycle it will work on, many engineers are agreed that the Diesel type of engine is bound to win out, but looking at it as a sluggish low speed industrial engine weighing 300 pounds per horsepower, they are prone to shrink back and "let the other feller pave the rocky road." In twenty-five years of aviation service, however, the gasoline engine has proved its incapability to live up to the requirements, and if the ultimate in aircraft engine design is ever achieved, it will certainly be in the form of a high speed Diesel.

For instance, to quote Capt. Woolson, chief aeronautical research engineer for the Packard Motor Co., in a paper read before a recent session of the Society of Automotive Engineers:

"Heretofore, the subject of aircraft Diesel engines has been treated as an idealistic topic in which certain practical achievements were realized as a result of painstaking and far-reaching research. Necessarily, however, as in all problems of a scientific nature certain assumptions have been made by the various investigators, and while such a broad statement may be subject to criticism, nevertheless it would seem that there is a general foreboding of extraordinary difficulty in the task of making the Diesel engine sufficiently light for aircraft propulsion purposes."

And a little further on,

"It has been assumed in many quarters that the high maximum cylinder pressures encountered with the high speed Diesel principle militated against sufficiently light engine construction to permit its usage for aircraft power plants. That this fear is unfounded is perhaps best proved by the fact that the Packard Diesel aircraft engine weighing less than 3 pounds per horsepower has been subjected to considerable flight testing as well as several hundred hours of ground testing, and a construction has been evolved which is fully capable of withstanding cylinder pressures well in excess of 1200 pounds per square inch, without having recourse to exceedingly heavy construction."

The Diesel cycle has been employed extensively in engines for various industrial and marine purposes for a quarter of a century. Such engines, being necessarily of the low speed type, for maximum reliability, have been designed for peak cylinder pressures very little in excess of the compression pressures. These have been around 550 pounds per square inch as compared to 500 pounds for the compression pressure. Such engines operate on a true constant pressure cycle, the cylinder pressure being maintained approximately constant for a considerable portion of the power stroke, the fuel injection being timed to occur about top dead center or slightly after.

This, of course, is in contrast to the constant volume cycle employed in the gasoline engine, which ignites its compressed fuel at a considerable lead, so that it burns under constant volume and suddenly increased pressure.

It is obvious, however, that an engine suitable for aircraft propulsion must be more or less of the high speed type, that is, operating in excess of 1400 r.p.m. Still higher speeds are of course desirable up to the point where propeller efficiency begins to fall off, which makes still higher speeds less desirable unless accompanied by reduction gearing, a questionable advantage in many cases, for obvious reasons.

It is obvious, therefore, that the Diesel engine for aviation purposes cannot follow tried and proven low speed Diesel design practice, as it is a new type of heat engine altogether. Granting then, that the aircraft Diesel engine must operate at speeds five or six times as high as those of the industrial low speed Diesel, and since the time required for the combustion of the charge is approximately the same, it will be obvious that the constant pressure or true Diesel cycle would be impractical, and therefore more or less of a constant volume cycle must be used.

In order to accomplish the desired purpose, therefore, it has been found necessary by most investigators to inject the fuel as early as 50 deg. before top dead center in order to insure complete and smokeless combustion, whereas in the low speed Diesel, injection starts from ten degrees before to ten degrees after the center.

It will be noted that, although the maximum cylinder pressure is as high as 1200 pounds, it falls off rapidly after the piston gets over the center, resulting, therefore, in a mean effective pressure which does not quite compare with that obtained with gasoline engines. This is no doubt due to the necessity of an early ignition point, which, in turn, is made necessary by the higher flash point of injected fuel as compared with that of carbureted fuel.

There are, however, tremendous possibilities for improvement here, mainly in the fuel injector itself, which is as yet a crude and deficient mechanism.

In stationary and marine Diesel practice of the past, two methods of fuel injection have been used, the "solid injection" system, and the "air injection" system. As far as injection alone is concerned, the air pressure system is the most efficient because its ability to break up the fuel into fine particles is superior to that of the solid injection system. It, however, requires the use of an engine driven compressor and a tank in which the air is stored under a pressure of about 700-800 pounds, while the other method of injection requires only the use of a plunger type of pump for each cylinder, and therefore would be the logical one to use for aircraft purposes, although if a composite design could be evolved, it would doubtless prove advantageous.

The advantages of the Diesel engine over the gasoline engine are almost too numerous to mention. As stated above, aside from mechanical and compression troubles, which are not more numerous in one type than in the other, engine troubles occur in the carburetion and ignition systems. With a nine cylinder radial gasoline engine, there are two separate ignition systems, comprising two magnetos, and two spark plugs per cylinder. Whereas, incidentally, spark plugs in gasoline engines are subject to fouling, there is no chance for such an occurrence in the Diesel engine, nor any trouble analogous to it. With the necessary wiring, the gasoline engine ignition system comprises an aggregate of perhaps 1000 parts. Ignition in a Diesel engine is furnished solely by the heat of the compressed air charge, unlike so-called semi-Diesels or hot bulb engines, and merely necessitates a smaller combustion chamber volume as compared

with the gasoline engine. Further, the ignition system in any one cylinder is entirely independent of that of any other cylinder, so that should one go wrong, which, in itself, would be a rare circumstance, it would in no way affect the satisfactory operation of the others.

The fuel is delivered to the cylinders of the gasoline engine in a vaporized form by means of a carburetor. If a rotary fuel distributor is on the bill, the carburetor is of the single barrel type, while if the fuel goes directly to the engine, a three barrel carburetor must be used in order to facilitate proper mixture distribution to the various cylinders.

One of the outstanding advantages of the Diesel engine is the elimination of fire hazard in a crash or even in flight, which frequently happens, should something go wrong. As Captain Woolson puts it:

"Perhaps a more convincing proof of the decreased fire hazard of the Diesel engine can be furnished by citing actual experiences. In the laboratory work incidental to the development of new type of gasoline engines, gasoline fires are more or less of daily occurrence. In the course of the period of laboratory work with the new Packard oil engine, extending over a year, there has not been a single instance of fire occurring. Naturally, there have been innumerable instances in which fuel lines have leaked or even broken off, but in no instance did a fire result even when the fuel was flowing in a full stream over the hot engine. Such experiences as these are far more convincing of the non-inflammable character of fuel oil than any theoretical analysis of the fire possibilities based on the flash and fire points of gasoline and oil respectively.

"I believe that experience in this respect to date enables me to make the statement that fire after the crash of an airplane equipped with a Diesel engine would be practically impossible, and could only occur if the engine continued to run wide open with fuel oil pouring directly into the exhaust flame, an almost unbelievable contingency.

"We have now come to consider what has always been represented as the most important advantage of the Diesel aircraft engine, namely, economy in fuel consumption. I have purposely subordinated this question to those of safety and reliability, realizing that at the present time these latter qualities are of far more importance to the healthy growth of the industry than are questions of economy. Once it has been proven that the Diesel engine excels in safety and reliability for aircraft use, then the clinching arguments in favor of its universal adoption will be found in its far superior fuel economy as compared with gasoline engines."

And a little farther on:

"With aviation gasoline at 19.8 cents per gallon and a specific fuel consumption of .52 pounds per brake horsepower hour, the gasoline engine costs for fuel 1.7 cents per brake horsepower hour. The Diesel engine corresponding cost is .35 cents per horsepower per hour, or about one-fifth as much, a fuel cost saving of not less than 80 per cent.

"There is, of course, a dual advantage gained with the Diesel engine, due to the fact that not only is the fuel of a much cheaper grade, but also the weight of the fuel to be carried for any given cruising range is considerably less with the Diesel engine than with the gasoline engine, thus making it possible either to extend the cruising range or increase the pay load in accordance with the requirements of the case.

"Another point in connection with the Diesel aircraft engine is that lubricating oil is consumed cleanly to produce power and thus contribute its share to the efficient production of power in this type of engine. In other words, any excess of lubricating oil in the combustion chamber of a gasoline engine is naturally considered extremely undesirable, as the temperature of the cylinder wall is not sufficiently high to burn the oil completely, resulting in the formation of carbon and trouble with spark plugs from this source, whereas in the Diesel the temperatures are considerably higher, and there being an excess of oxygen always available, perfectly clean combustion of the lubricating oil follows. While excessive oil consumption in a Diesel engine is naturally to be avoided owing to the high cost of lubricating oil as a fuel, nevertheless, it is interesting to know that so far as the total weight of the oil consumed is concerned it matters little whether this consists of lubricating oil or fuel oil as far as miles per pound of oil carried are concerned.

"From a cooling standpoint, the air-cooled Diesel engine presents far fewer problems than does the gasoline engine. In the first place, high cylinder head temperatures, which must be avoided in a gasoline engine in order to prevent pre-ignition and detonation, offer no serious handicap to the Diesel engine designer.

"Similarly, exhaust valve conditions appear to be far more favorable in the Diesel than in the gasoline engine for the reason that exhaust gas temperatures are considerably lower due to the higher expansion ratio employed and for the same reason, there is considerable diminution of noise due to the exhaust.

"By the same token there is very little visible flame ejected from the exhaust ports, and it has been found quite feasible to fly the Stinson-Detroiter equipped with the Diesel engine without stacks or manifolds, thus eliminating a knotty design problem which is a continuous source of worry to airplane designers.

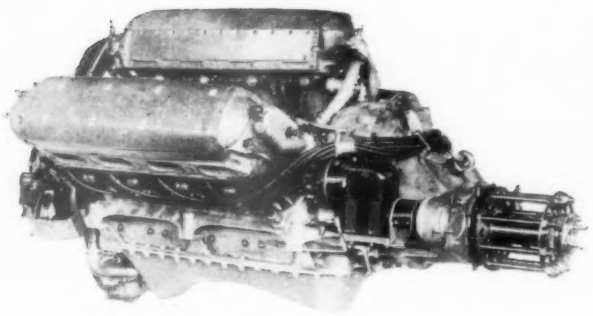
"An interesting point of advantage in connection with the Diesel aircraft engine is the fact that it will operate successfully in any position. All carbureting engines are dependent upon gravity for the correct function of the carburetor and consequently the gasoline engine will not continue to run beyond certain angles of inclination dependent upon the carburetor design.

"While this factor enters more into the stunting of pursuit ships than in any other phase of flying activities, nevertheless, it is a source of comfort to know that should the plane be placed in an

[*Continued on page 80*]

ARCH HOXSEY
Will the old principled power plant give way to the Diesel?

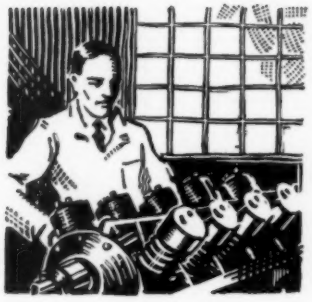
MOTORS



NAPIER LION, RACER

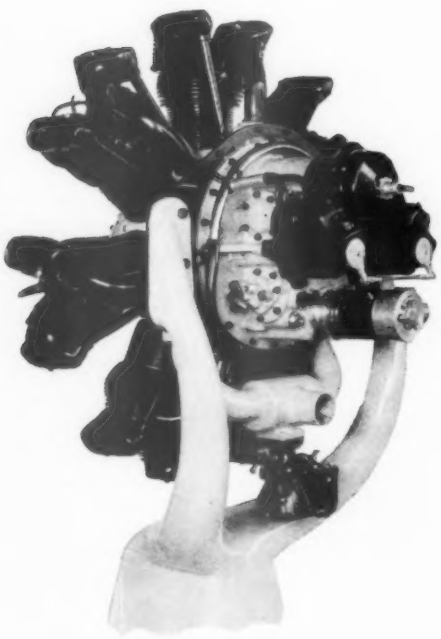
ESPECIALLY designed for racing, this powerful water-cooled engine is very compact. The complete weight dry is 930 lbs.

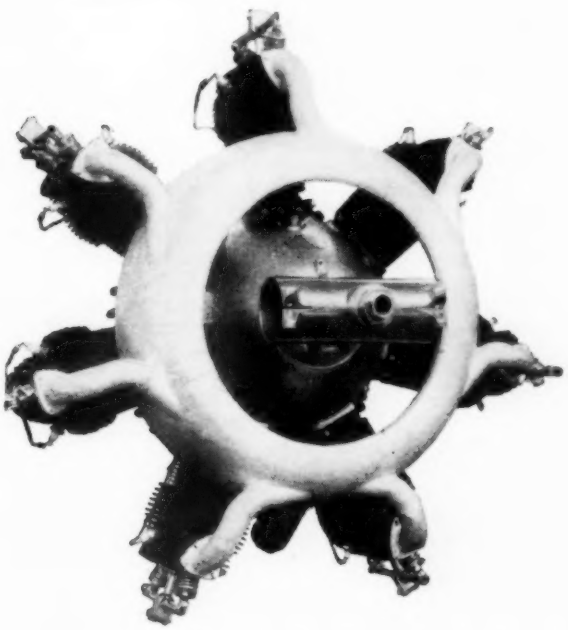
This engine differs from the standard Napier Lion in that the height of the engine has been reduced by shortening the connecting rods. The magnetos are fitted at the front end and mounted almost parallel to the crankshaft. Piping, etc., has been rearranged for most efficient cowling. Maximum h. p. is 875 b. h. p. at 3,300 r. p. m. Length 5 ft., 6¼ in.; width 3 feet, 2⅜ in.; height 2 ft., 10½ in.



THE COMET

THIS air-cooled engine (shown below) built at Madison, Wisconsin, was on exhibition at the Cleveland Air Show. It weighs 397 lbs. dry without exhausting or hub and develops 150 h. p. The exhaust ring is streamlined. Ventilation openings are located directly back of the cylinders. It possesses a single rocker arm, pushrod and cam, with resultant claimed efficiency of valve arrangement, 7 cylinders; displacement, 611 cu. in.





CONTINENTAL RED SEAL

A SEVEN-CYLINDER radial type power unit, built by Continental Motors Corp., develops 150 h. p. at 1,850 r. p. m. a 5 to 1 compression ratio is used. The bore and stroke are both 4⅝ in. giving a total displacement of 544 cu. in. This engine contains no oil tubes, the leads being drilled in the proper parts.

Is Endurance Flying "Stunting"?

Wide World

By ALLEN H. LOUGHEAD

Recent distance and endurance flights have come in for so much criticism that this statement by Mr. Loughead, given in an interview with one of our staff correspondents, is particularly timely.

MUCH has been said of late in reference to endurance flying. In particular a storm of criticism has been raised by well meaning persons, who characterize it as a needless type of stunting compounded by an extra hazard.

There has even been talk of prohibiting experimental journeys of this type by law.

It is hardly accurate, however, to consider the young pilots and their backers as mere publicity and sensation-seekers who would as soon sit it out on a flagpole if proportionate newspaper notice were forthcoming.

The men who engage in these flights are for the better part sober and earnest devotees of the art to which they are wedded. For the most part they and their backers are actuated by a boundless enthusiasm for flying and the pioneering urge which is directly at the back of all utilization of genius.

The value of tying an airplane into knots has long since passed. We who are charged with the duty of advancing civil aviation cannot longer educate the world to its safety and economy by stunting our products. The airplane is not now an experimental toy.

Aside from necessary pioneering, there must be presented to those who have not learned the advantages of aviation, present qualities of planes and engines. This may be accomplished in several ways. The orthodox manner, of course, is paid advertising. This is valuable, but does not tell the whole dramatic story, and manufacturers and distributors quite naturally turn to a type of story-telling more sure in its immediate results.

Two years ago when long-distance flights captured the world's imagination, many in the industry itself decried them as spectacular stunts which would bring more harm than good to aviation. Certain of the flights were undertaken with insufficient capital, inadequate equipment and too little training and experience on the part of the pilots.

Others, well conceived and executed, succeeded. I would not give the suggestion that all failures were the result of reasons advanced earlier in this discussion. Many brave and thoroughly prepared attempts were beaten because of conditions which could hardly have been foreseen.

The results of these distance flights have now proven so astonishing and so valuable, that they are no longer looked on by the knowing as the prerogative of adventurous and rash young men. We have come to consider them as part of the necessary program of aviation—the aerial forerunners of inter-continental, international and trans-oceanic commercial transport.

It is not my purpose here to debate the relative advantages of heavier-than-air and lighter-than-air craft. Both have their functions, and time will mark the proportionate desirability of each for any purpose. Simply, that long-distance flight proves beyond a doubt the durable qualities of American planes and engines.

The great value in long and continuous journeys, both in sense of distance and time, lies not in actual mileage or hours, but in the practical demonstration that valuable and heavy cargoes, whether

International News

The "Bremen" landing at Murray Bay, Canada, the first successful East to West flight of heavier-than-air craft

human or material, can be transported rapidly through the air.

If an aviator can lift a plane off the ground with a useful load of two tons and continue the flight, say, three thousand miles, it becomes evident that he can hop off with a disposable load consisting one-half of fuel and oil and one-half of material or passengers, and by landing once or twice or being refueled in the air, cover three thousand miles in approximately the same time. Thus, in about eighteen hours we can ship across the continent anything that justifies necessity for speedy delivery at a fairly high cost per mile of transportation.

With a load of fifteen hundred pounds of gasoline and an equal weight of securities, I believe a plane properly powered and streamlined with the N. A. C. A. cowling for reducing head resistance, before long will be able to cross between Los Angeles and New York in sixteen hours. The interest saved on the securities will more than pay the costs of such a flight. In a short time flights of this nature will become commonplace. Their value to business need hardly be pointed out.

Of course, there are risks involved. In the future many trans-oceanic and other pioneering flights may come to grief. It is too much to expect that all will succeed. Yet nothing will be gained if nothing is ventured, and we of the industry believe that the benefits to be attained are commensurate with the known attendant hazards. Before inter-continental passenger service can be achieved on anything like regular schedules, these flights must continue.

These duration attempts carry the prestige of American products to the corners of the earth. We have been fortunate thus far in that American planes have led the world in record-achieving feats. From a business point of view, they have the effect not only of stimulating immediate sales, but also of changing the attitude of many towards the thought of flying.

I recall that after one particularly noteworthy performance a wealthy Californian, who had never been in the air, stated he would soon purchase a plane and engage a pilot, that he might move swiftly between Pacific coast cities. The fact that he actually did not purchase the plane is unimportant. *What is important is that he changed his mind about flying!* So have millions of others. Sooner or later many of these will have their own planes, while others will utilize established airlines.

The navigator's knowledge spells success or failure. Picture shows Capt. Harry W. Lyons on board the "Southern Cross"

There can be little doubt that the earlier long flights have stimulated establishment of long airlines over routes once thought to offer too much danger. Recently a company started a passenger and express service between Seattle and Juneau, Alaska. They use a stock model seaplane capable of transporting five people 1,080 miles in seven hours. Here is a difficult journey, formerly requiring the better portion of a week, which is now accomplished in less than a day. Anscel Eckman, who pilots the ship between Seattle and Juneau for the Alaska-Washington Airways, often carries fresh butter and eggs into the territory. He has on one occasion saved the life of a woman requiring swift and expert medical assistance.

These things would have seemed fantastic before the era of Lindbergh, Chamberlin, Goebel and other courageous members of the advance guard.

In reference to flights now in the course of preparation, and those which may be projected in the future, in my opinion, their value depends largely on adequate precautions. It is difficult to say whether one thing is more important than another to assure the success of the trip. Manifestly a splendid power plant will be of no worth if the pilot does not arrange a capable method of navigation. Conversely, the best navigation in the world will prove futile if the engine or plane fails.

If a pilot plans to attempt to make the route solo, he plainly must have a system of navigation with which he can figure his position in a brief time. I know of one pilot now planning a long hop who in his practice calculations has been able to figure position in 48 seconds with an error of less than four miles.

Where large stretches of water must be covered, the most favorable conditions can be assured by listening attentively to the weather man. Once out of sight of land, dependence can usually be placed on reports from nearby ships relative to conditions ahead. Thus, storm areas can be avoided, unless they are of wide extent.

The take-off should, of course, be carefully handled and prepared for. The runway should be properly surfaced and adequate in length, or the heavily loaded plane will come to grief.

The maximum load an airplane should carry when leaving for another continent cannot be prescribed. This depends on many factors, not the least of which is the pilot's experience and ability to handle a heavy machine. The take-off on a distance flight is one time in a pilot's life when he should "fly the plane off" and not attempt to jump it off by too early use of his controls. Shoving the tail down and forcing the nose of the heavily laden ship upward after a short run usually results in tragedy.

Every pilot contemplating a long flight wants to leave with a minimum of useless weight. He should not omit anything that can be of positive value, however. To do so is a needless kind of hardihood. I have known flyers who would carry a single compass to avoid the weight of a second and third. If that compass should fail he would have no means of checking his course other than celestial observations. Three compasses are none too many. [*Continued on page 111*]

COMMERCIAL AVIATION

A Review of Governmental Requirements and Activities and a Suggestion of Futures

By S. R. FERRIS

The Department is always alert to improved tests

Bureau of Standards

TODAY the words "commercial aviation" fall so readily from our lips that it seems incomprehensible that the phrase had its official inception a little more than two years ago. Yet on May 20, 1926, the Air Commerce Act was signed by the President, giving the control of civil aeronautics to the Department of Commerce, under the immediate direction of Hon. William P. MacCracken, Jr., Assistant Secretary for Aeronautics, appointed by the President. The bill was the culmination of fourteen years of argument for Federal legislation and regulation of civil flight, and laid the legislative corner stone for the development of civil aeronautics in America.

Previous to the passage of the Air Commerce Act of 1926, the Secretary of Commerce had given intensive study and continuous encouragement to civil aeronautics in the United States. He had repeatedly emphasized the great commercial possibilities for aircraft in America and lent every aid to the art which, until the passing of the act, was proceeding without direction, control, or limitation. When the official authority to encourage, develop, and regulate, was delegated to him by Congress, he created the Aeronautics Branch in the Department of Commerce; the most recent agency of the United States Government to have to do with aircraft.

The new act provided comprehensively for the promotion and regulation of civil aeronautics. The most important of its provisions were those for the establishment and maintenance of civil airways and their equipment with intermediate landing fields, beacon lights, signal and radio apparatus and other aids to air-navigation; the establishment of air-traffic rules; the inspection and licensing of aircraft; the examination and licensing of airmen; and the identification of aircraft; the collection and dissemination of information pertaining to air commerce and the state of the industry, including data concerning the causes of accidents; the establishment of a suitable weather service on airways; the charting of airways, and the publication of air maps; the promotion of air commerce, industry, and trade; and the conduct of scientific research and development work tending to the improvement of facilities for air navigation. The act further provided for the rating of air ports as to suitability, and for the encouragement of the establishment and maintenance of air ports by municipalities.

But the act did not create a new bureau in the Department of Commerce to perform these manifold duties. The intention was that, so far as practicable, the duties imposed should be distributed among existing agencies of the Department. Accordingly, the task of establishing, maintaining, and operating aids to navigation along air routes was assigned to the Lighthouse Service; the mapping of air routes to the Coast and Geodetic Survey; and the scientific research for the improvement of air-navigation aids to the Bureau of Standards.

But the Department of Commerce had no facilities for the examination and licensing of aircraft and airmen, for the enforcement of air-traffic rules, or for the collection and dissemination of aeronautical information. It was, therefore, necessary to set up new instrumentalities to deal with these matters, and two special divisions were accordingly established—the division of Air Regulations and the division of Air Information.

The organization of the Air Regulations Division presented one of the most difficult of the early problems, for the personnel must obviously possess unusual qualifications. Aeronautical engineers and inspectors are required, capable of advising with manufacturers and technicians in determining the airworthiness and suitability of aircraft. The inspection of aircraft and the examination and licensing of pilots and mechanicians require a force of inspectors skilled in the maintenance and operation of aircraft, with piloting ability well above the average.

The act provided for a determination

of the physical fitness of licensed pilots and of applicants for license—a service that can be performed only by physicians with knowledge of flight requirements. In considering the work of the Air Regulations Division it should be remembered that a continuing inspection service for licensing aircraft must be maintained, and that the physical fitness of licensed pilots must be checked at intervals. A medical director was appointed to organize the work of giving physical examinations to pilots and to applicants for pilot's licenses, and about two hundred physicians and surgeons at various points throughout the country were designated as medical examiners for the Aeronautics Branch.

For the purpose of facilitating inspection and examination work, the United States was divided into eleven main districts. Each district is under the jurisdiction of a supervising inspector who is responsible for the other inspectors working in that district. More than 40 men are employed in this field of inspection work. For the purpose of making the inspections uniform throughout the United States very definite sets of instructions are furnished all inspectors. The efforts of the organization are directed from Washington by a chief inspector. When it is realized that civil planes are now being placed in operation at the rate of over 400 a month, the problem of bringing all civil craft and their operators under the system of registration and inspection is seen to be a large one.

The duty of enforcing the air traffic rules as well as the investigation and assessment of penalties for violations, devolves upon the Air Regulations Division. These rules are analogous to the rules of the road for ground traffic and cover minimum heights at which aircraft may be flown, acrobatic flying over congested areas, crossing aircraft, right of way, dropping objects from aircraft in flight, weather and distress signals, and the display of lights during night flights.

The Air Regulations Division is further charged with the inspection and licensing of airplanes at the time of their manufacture. It is the duty of this branch to flight test and inspect all new types of airplanes prior to their eligibility for license, and to license such ships as are approved, as rapidly as they are manufactured. All principal factories have one of these factory inspectors when their production program warrants. These factory men in turn are under a factory supervising inspector who is responsible for the activities of the men, ten of whom are now busy.

The other new division created by the Air Commerce Act, was the Air Information Division. This division is the point of contact between the activities of the Department and the industry. It is the fact-compiling and publishing agency of the Aeronautics Branch, and the office for liaison with the information offices of other governmental bodies engaged in aeronautics.

The Air Commerce Regulations provide that: "Engines which have passed the regular endurance tests of the United States Army Air Corps or the United States Navy Bureau of Aeronautics will be approved by the Department of Commerce. Other engines submitted for approval will be tested by the Department of Commerce at the Bureau of Standards. Under the title "Aeronautical Research Division," the Bureau of Standards deals directly with the manufacturer until the test is completed, when a report with definite recommendations is made to the Director of Aeronautics. The engines are subjected to a severe endurance test either at the laboratory in Washington, or at a special laboratory set up for this purpose at College Park, Maryland. At the latter "proving ground" the engine is mounted on a torque stand and drives a special propeller which absorbs the power and blows a 90-mile gale of wind past the engine cylinders. A detailed history of the test is made and photographs of all parts which failed, were replaced, or showed undue wear are included in the report to the Secretary of Commerce for Aeronautics. The design and performance of the engine are discussed in the report, and suggestions are offered as to the probable causes of any failures. In case an engine cannot be recommended for approval, the conditions to be met by the manufacturer before a retest can be undertaken are specified. However, the approval of an engine only covers its use with a suitable propeller. The propeller is considered too small if it permits the engine to turn up more than its rated speed at full throttle on the ground.

Every instrument used in an attempt to break a World's record is submitted to the Aeronautical Research Division to be put through a "flight history test," because, in the case of barographs and similar instruments, the first reading does not give the true result. Corrections must be determined in the laboratory and applied before the altitude reached can be stated with certainty. For these tests a special chamber has been constructed in which the conditions existing at any altitude can be duplicated.

In the early days of scheduled flying the Bureau of Standards cooperated with the Postoffice Department in developing beacon lights, and played an important part in producing all of the present aids to air-navigation. The first successful model of the earth inductor compass, which guided Lindbergh across the Atlantic, was a product of Drs. L. J. Briggs and Paul R. Heyl of the Bureau.

Recently, the radio section of the Bureau of Standards has been busy in working out a successful airplane-beacon, receiving set, and antenna; and this work has resulted in a system which bids fair to revolutionize air-navigation. By

[*Cont'd page 56*]

It is the work of the Department of Commerce to provide airways over which shipments of perishables may be made

Upper right is Camp Wigwam, near Erie, Pennsylvania. The lower left is Kahkwah Country Club of Erie.

Aerial Photography Made to Pay

Some excerpts from a letter from Frank S. Gehr, an amateur photographer living in New York City. AERONAUTICS will welcome any thoughts or experiences which might be helpful in the business or pleasure of aviation.

THESE two photographs were taken with a five-by-seven Graflex, using a 4.5 lens. After experimenting on other shots, we discovered that by stopping the camera down a little and using a 2-X color filter, and the Eastman Kodak Co. aerial cut film, we produced what we think were wonderful results. The one of the camp was Camp Wigwam, but now named the Great Lakes Camp, and the other The Kahkwah Club at Erie.

"Both pictures were taken from Travelair biplane on about an average of 800 feet. The shots were taken from the front cockpit looking back from the corner between the wing and the fuselage. In this way the bellows of the camera was protected from the blast of the prop. To safeguard against losing the camera, we used a belt through the handle and around our neck, which left both hands free.

"A good deal of business could be picked up by a pilot and camera man from real estate companies, clubs, camps, summer resorts, factories and entire towns and city lay-outs. Also, many shots from the air are being used for news and educational purposes. The Rural New Yorker, a farming paper printed in New York City, has used some of my pictures, one being a haphazard shot of the countryside near Erie.

"As far as price is concerned, we did not charge enough. We charged $30 for the first negative and $25 for any following. The price of the plane, negatives, printing and developing and time figured in, would make this too low for much profit. We were doing this on an experimental basis, but were able to break even."

AERODYNAMICS

by Alexander Klemin

Professor of Aerodynamics, College of Engineering, New York University

Article 12
Longitudinal Stability

Mechanical Analogies for Stability

THE static stability of a body is its ability to return unaided to the original position from which it has been displaced.

When a cone is placed on its base, as in Fig. 1, the cone is stable. Tilted

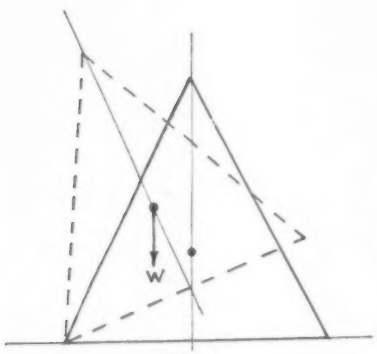


Figure 1

slightly to one side, it will return to its original position, because the force of gravity acting through the center of gravity has a restoring moment about the edge in contact with the ground.

If the cone, by skilful handling, is balanced for an instant on its apex, as in Fig. 2, the slightest displacement will

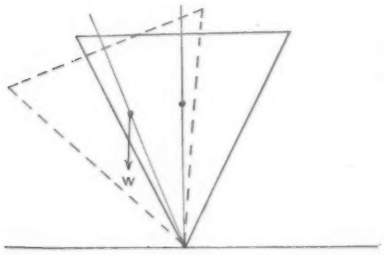


Figure 2

cause it to topple over sidewise. The cone in this position is said to be unstable.

Now if the cone is placed on its side, as in Fig. 3, and is slightly displaced, it will neither return to its original position nor topple. It is neither stable nor unstable, but in neutral equilibrium.

So much for static stability.

If a spring supporting a weight is pulled down by a man's hand, as shown in Fig. 4, and is then released, it will oscillate up and down, and only come to

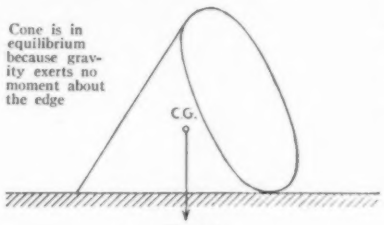


Figure 3

rest in its original position after a number of oscillations. The spring is statically stable, but its oscillations are undamped. If the weight is placed in a

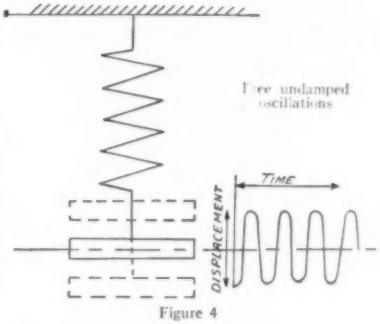


Figure 4

heavy viscous oil, the oscillations before coming to rest will be much fewer in number. The spring is damped, and has not only static, but dynamic stability as well.

An Ordinary Wing Alone Would Give an Unstable Airplane

In article 5 of this series we discussed

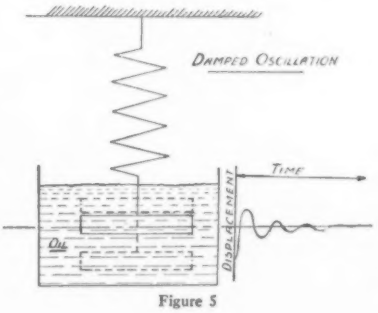
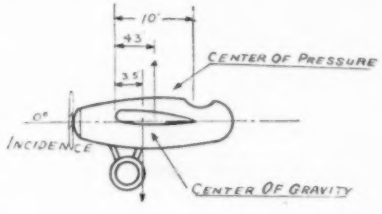
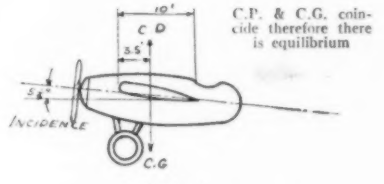


Figure 5

the properties of the Clark Y airfoil, and in Fig. 6, the characteristics are replotted for reference.

Suppose we had a rudimentary airplane, supported by a wing of 10-foot chord, having no tail surfaces (as shown in Fig. 7) and a center of gravity situated on the wing chord, at 35 percent of the chord, or 3½ feet from the leading edge. From the chart of Fig. 6, the center of





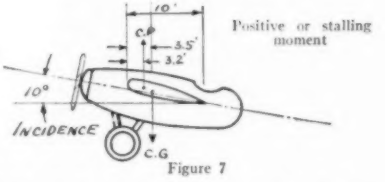


Figure 7

thrust for the time being, the airplane will be in equilibrium at this particular angle of incidence.

Now imagine that either a movement of the control stick or a sudden gust

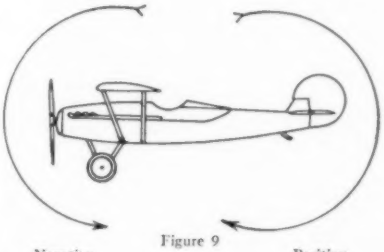


Figure 9

pressure of the wing will pass through the center of gravity when the angle of incidence is about 5¼ degrees. Disre-

garding the effects of drag and propeller raises the nose of the airplane until the angle of incidence is 10 degrees. From the chart we see that the center of pressure is now at 32% of the chord, and therefore the lift is .3 feet ahead of the center of gravity. Evidently the rudimentary airplane tends to nose up even more.

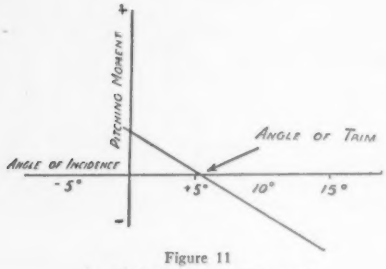


Figure 11
A typical pitching moment curve

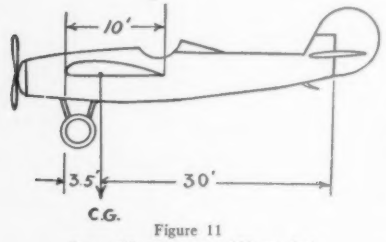


Figure 11
Span 60'—wing area 600 sq. feet
Horizontal tail area 90 sq. feet

If, on the other hand, the airplane should for some reason go down by the nose till the incidence is 0 degrees, the center of pressure will move back to 45% of the wing chord, and the lift will be back 1 foot of the center of gravity. Therefore, there will be a tendency to push the nose down still further.

Evidently an airplane with wing alone will be unstable.

How the Horizontal Tail Surfaces Produce Stability

In Fig. 8 this rudimentary airplane is equipped with a horizontal tail surface, disposed at a negative angle to the wing chord. If the tail surface is symmetrically double cambered, and if downwash effects of the wing are neglected, then there will still be equilibrium of the airplane at 5¼ degrees incidence, provided the tail surface is then at zero degrees.

Now imagine the wing again raised to 10 degrees incidence. The tail surfaces are now at (10—5¼)=4¾ degrees incidence, and therefore exercise an upward lift, and the moment of the tail surfaces counteracts the moment of the wing, and if the tail surfaces are large enough the plane will swing back to its original position.

If the plane should nose down till the incidence of the main wing is zero, the tail surface will now be at a negative incidence of —5¼ degrees and the tail lift force will act downwards, thus again restoring equilibrium.

Definition of Pitching Moment

The longitudinal moment about the center of gravity produced by the air forces on the wing tail surfaces, etc., is termed the pitching moment.

If the pitching moment is such as to raise the nose of the plane it is said to be a positive or stalling moment. If the pitching moment tends to lower the nose, it is said to be a negative or diving moment (see Fig. 9).

If a plane is trimmed (that is, in equilibrium at a certain angle of incidence and flying speed), then the pitching moment at any angle should always bring the plane back to its original incidence. This is illustrated in Fig. 10. At 5¼ degrees incidence, the pitching moment is zero, and the plane is in equilibrium. If the incidence is diminished below 5¼ degrees the pitching moment should become positive, and nose the plane back to the 5¼ degrees incidence. If the incidence is increased above 5¼ the pitching moment should become negative, so as to nose the plane down. The pitching moment curve should have therefore a negative slope, or slope downwards, from left to right to give stability.

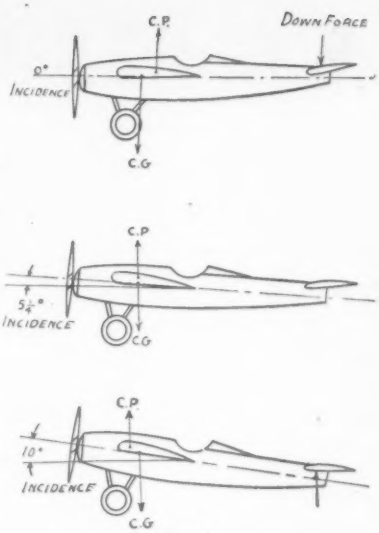
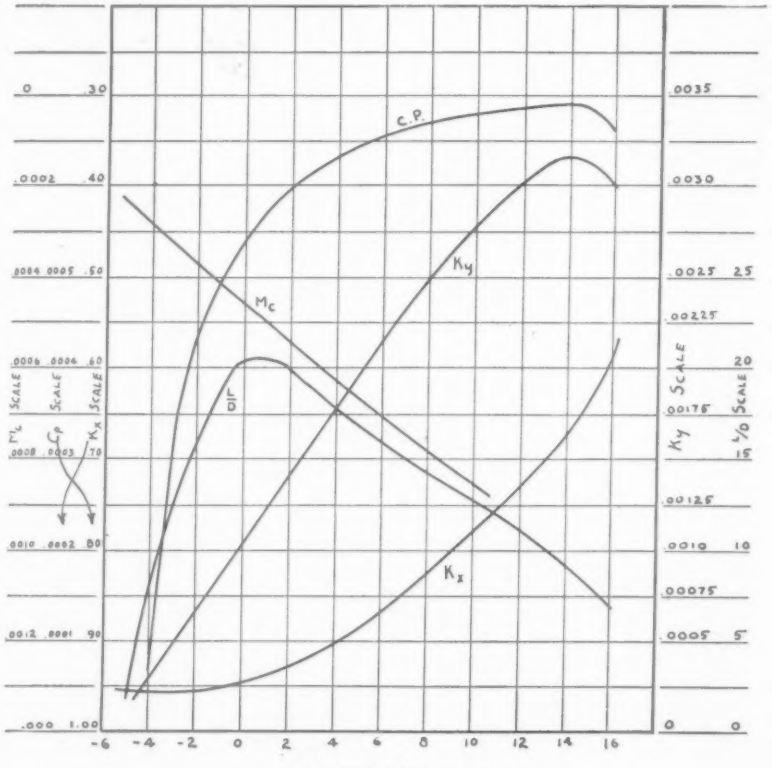


Figure 8
Rudimentary plane with tail surfaces

Will a Given Airplane Be Stable?

SUPPOSE our monoplane of 10-foot chord, center of gravity at 35% of the chord, span of 60 feet, wing area of 600 square feet, with a loading per square foot of 10 pounds, be longitudinally stable, if the horizontal tail surface has an area of 15% of the wing area, that is 90

[*Continued on page 86*]



Angle of attack in degrees
Characteristic curves for Clark Y. Airfoil (Fig. 6)

Stock Market Should Continue Strong

B. C. Forbes warns of severe intermediate market reaction but indicates trend is still constructive. Recommends individual stocks with full analysis of new but promising issues.

Written for Aeronautics by

B. C. FORBES and R. W. SCHABACKER *

THE aviation industry should be highly gratified at the good share of general prosperity of the nation which is coming to its doors and its coffers. Economists and authorities on business have recognized an exceptionally high rate of prosperity throughout the United States this year, especially in the period from about February through the early Fall months. The man in the street has been more inclined to reply that American prosperity in the last few years has been growing more and more selective, that huge corporations are garnering the big profits and color the general picture by their bigness, while the smaller business and the smaller company is going down instead of up.

Such a view may be largely sustained but it seems also true that more and more small businesses are finding the advantage of alliance in larger units and are thus solving their own problems by realizing the trend of the times toward combination and co-ordination. Thus, in a way, the small individual business man has only himself to blame if he does not join the general movement. Before the process of modern mergers is even temporarily checked it seems probable that the management of any business organized on sound fundamentals will have at least a few offers to join in this march of combination. The aviation industry is no exception. In fact, because of its comparatively recent development and the constant organization of new units, as well as due to its rapid growth, the process of combination and merger has been, and should continue to be, more rapid and more noticeable than in most other major lines.

From a standpoint of prosperity, therefore, the aviation industry is going ahead comparatively quite as fast as the other important classifications. Steel production has set

*Mr. Forbes, above, is Editor, and Mr. Schabacker, Financial Editor, of Forbes Magazine

up new high records during the past Summer. The motor industry has done likewise and appears to have passed its lowest Summer levels without getting closer to last Summer's total production figures than a 1929 advance of around 100,000 units. It is generally conceded that August probably set that intermediate low mark but that production of around 500,000 units was still about 25 per cent. above the same month of last year. The building industry has been a general laggard in 1929 but has more recently snapped back into its old form with a new high record volume of new contracts for this year, and to set up the second highest monthly record in the history of the industry.

Has the airplane industry kept pace with these favorable records of the other major lines? Most assuredly it has, and, comparatively, it has surpassed them. The development in construction of new landing fields and airports, in marking air routes, in granting of new pilots' licenses, enrolling of new students in air schools and aviation courses, all indicate the rapid upward trend of the industry. The air mail system is almost steadily setting up new high records, many of the larger and smaller transport concerns are making new records for pay load every few weeks, domestic output of planes and parts is running at record levels and exports of American-made aviation craft and supplies show a jump of better than 300 per cent. over last year.

For the first half of 1929 the cash value of all aeronautical exports was nearly $5,200,000, compared with less than $1,700,000 in the first six months of last year. Exports for the first half of 1929 show a gain of about 80 per cent. over the total for the entire twelve months of last year. The current gains are well distributed, being of about equal percentage in aircraft, motors and parts.

Such favorable advancement of business and generally satisfactory progress in earnings of individual corporations has laid a solid foundation for good performance of aviation securities in the past month. There is a fine, and also significant, distinction between the individual career of any single stock group and the degree in which it swings with the general market. General market prices have not advanced so rapidly as during July

[*Continued on page 88*]

THE INVESTOR

IN this welter of changing aeronautical conditions, rapid amalgamations and swift growths, much doubt may well be entertained as to the advisability of purchase of stocks on which complete information is not available.

To fill this need AERONAUTICS will be glad to answer as accurately as possible all queries in reference to investments. These should be addressed to *Aeronautics Advisory Investment Service.*

THE MONSTER

A German Experiment in Gigantic Air Cruisers...

By JOHN H. D. BLANKE

DR. CLAUDIUS DORNIER
Designer and Builder

THERE has been much discussion in the last few years as to the practicability of heavier-than-air planes capable of large scale trans-oceanic transport. The factors of safety and economy in a service of this type make huge construction practically a necessity.

Engineers and builders have generally viewed the practical possibility with negative eyes. The recent trial flight of the three decked all-steel Do.X at Lake Constance, Switzerland, has consequently held the undivided attention of manufacturers, engineers and operators thruout the world.

Much speculation in reference to the lift and handling possibilities of the huge craft was erased when it took off easily at its first launching, rising into the air after a run of only five hundred yards. At a subsequent trial powered by its twelve Siemens-Jupiter motors, with a combined efficiency of 6300 h. p., it rose to a ceiling of 6500 feet with a full load. The great ship seemed to handle with the greatest ease and its builder, Dr. Claudius Dornier,* expressed the idea that it came fully up to all expectations of performance.

Contrary to conclusions of other builders, it is Dr. Dornier's belief that the larger the construction the greater the efficiency. He intends to demonstrate the correctness of this point by the use of the Do.X for trans-Atlantic and long haul commercial flying.

The Do.X is a monoplane with high set wings of the cantilever type, with a span of 157.4 feet.

The wings fastened laterally to the top of the hull are additionally joined by three struts to the combined stub wings and floats projecting from the lower part of the hull (see illustration No. 1). This peculiarity of design is reputed to give great lateral stability to the ship, and to help reduce take-off run for a quick lift. In the air they give additional lifting surface. The total bearing surface is 5300 sq. feet. The wings' interiors provide a gangway sufficiently large for motor inspection and repair.

The motors are of nine cylinder, radial air cooled type, each developing 500 to 525 h. p., and are mounted in line back to back (see illustration No. 3). They are supported by a streamlined structure opening up into the gangway inside the wings, thus making them completely accessible during flight. Each motor operates as an individual unit and may be shut down independently. All motors respond to single electrical control.

The r.p.m. of each motor is indicated individually, and a complete set of gauges in both pilot's and engineer's room enables immediate and accurate checkup of all units at all times.

The ship has tremendous reserve power, and it is stated that four, or even five, may drop out of action without the ship losing altitude. The accessibility previously mentioned provides for the possibilities of repair in the event of motor failure, and in consequence insures against forced landings due to engines falling into trouble or going dead. It is further claimed that the capability of the power plant is so great that the motors may be throttled forty per cent immediately after the take off.

The hull is built on the general lines of a glider. The bows are of rather V shaped section flat at the bottom. This ends in a step at about four-tenths of the hull's 131.4 feet over all. From the step a short keel starts, and ends fur-

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** The February issue of AERONAUTICS carried a description of the Dornier works and its activities, with specifications on previous Dornier flying boats, which are largely of the same design. Dr. Dornier was formerly associated with Count Zeppelin and is equally expert in the design of dirigibles.*

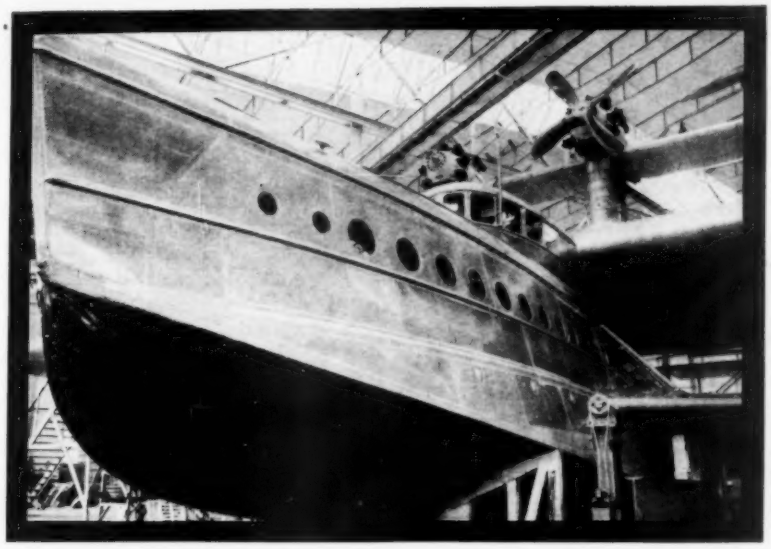
DORNIER DO-X

ther down in a small rudder for navigation, behind which the boat's bottom has a very flat V-form tapering towards the tail.

Inside the hull there are three decks, each with ample head room, and subdivided by several watertight bulkheads. The lowest deck holds the fuel tanks, loose equipment, stores, goods, etc.

The middle deck is the main one and is reserved entirely for passengers. It is 66 feet long without kitchen, and dependent on the desires of the transport company, may be provided with rooms for day accommodation, special entertainment rooms, or sleeping rooms. It of course may be appointed in any fashion to meet the demands of the public it services. For use in long distance flights the rear section of the fuselage may also be separated from the passenger cabins by a special partition so that it may serve as accommodation for a substitute crew shift.

The third deck is built on the order of a large cabin. The forward end, fitted with large all vision windows, forms the pilot's compartment. Directly back of it is the navigation room, which also serves for the Commander and his first mate. Then follows the engineer's room. He, with four mechanics, is responsible for the technical detail of the boat and its motors. From this room start the gangways leading right and left into the wings and the motors above them. These gangways also hold the gasoline and oil lines which may be kept constantly under observation. In the engineer's room is also a complete set of gauges for the control of all motors. It also contains an auxiliary motor which drives a dynamo to supply current for lighting the ship and for running the many indicators and other instruments.



Edwin Heinze

The Bow—Note turret-like mounting of the engine Nacelles and the connecting interplane

The last compartment of the third deck holds the wireless room.

No wood is used in the ship, the entire construction being of steel and duralumin.

The cruising speed is 120 m.p.h. Her maximum speed is calculated at 150 m.p.h.

The twelve motors were designed to lift a load of fifty tons, but it is now believed will permit a take-off with better than sixty tons.

The published estimates of carrying capacity of one hundred passengers and crew, are, of course, dependent on the length of flight and consequent weight of gasoline load. For long hauls a pay load of ten tons is estimated. For short distances this may be increased to as much as twenty-five tons (exhaustive tests have not yet indicated these as complete figures and they are consequently largely surmise).

The Do.X manoeuvers easily under single pilot handling, altho dual control is provided.

It is claimed for the ship that the relative location of motor room and fuel tanks, and the ready and free accessibility of fuel lines, is such as to make the danger of fire very remote. As an added precaution against explosion protective gas is utilizable in the fuel rooms.

As a matter of some importance it is to be noted that the big boat operated with exceptional quietness in the test flights.

The second Do.X is being constructed by Dr. Dornier for the Italian Government. It should be mentioned that a large share of the credit for this great achievement is due Dr. Dornier's brother Moritz. —Ed.

George F. Paul

A closeup of the powerful Siemens-Jupiter motors with Dornier propellers

BRIEF NOTES FOR THE MONTH

A digest of the important information and developments of the month, compiled each issue for the busy executive with vital information classified and quickly accessible.

AIRPORTS

Curtiss Airports Corporation will build a parent airport on its 325-acre field at Valley Stream, Long Island. It will contain a complete flying school with all facilities for instruction and training of students.

The Boeing Companies recently broke ground for the first building to be erected on the United Airport of Burbank & Los Angeles. This 240-acre airport is to be developed by Boeing as a model airport.

Lynn Schloss, engineer in charge of construction, announces that work has begun on the new $1,000,000 airport of the San Francisco Bay Airdrome, Inc., at Alameda. It will have a waiting room with a capacity of 200.

Perry Fellows, Detroit city engineers, has anounced that construction of the new million dollar hangar and exposition building at the Detroit municipal airport will be started in the near future.

The Rhode Island State Airport Commission created by the last General Assembly has selected a large tract of land to be made into an airport near Providence, R. I.

Savannah, Ga., is pushing development of its municipal airport, which will be one mile square and cleared and level from corner to corner. The field is about five miles west of the city.

General Motors is reported buyer of 740 acres at Teterboro, N. J., to develop a great air center.

The City of Roswell, N. M., is completing a 400-acre port. The field is circular, with administration building, hangar, etc.

Lake Wales, Fla., will dedicate a new port replete with repair shops, hotel, hangars and other buildings this fall. 320 acres.

Oakland, Calif., Municipal Airport has just opened a $55,000 airport inn. Interstate Company are the operators, Harry E. Brown, manager. Goodyear Tire & Rubber Co. hangar is under way at Gadsden, Ala.; 200 feet long, 75 feet wide, 75 feet high.

B. Russell Shaw Co., Inc., airport engineers, have begun construction of a Municipal Airport at Abilene, Texas.

The Business Men's Club of Socorro, New Mexico, is sponsoring an airport in Socorro, now under construction.

The City of Beaumont recently passed a $100,000 bond issue for the purpose of building a larger and better municipal airport.

Cochran, Ga., has just completed a modern municipal port one mile east of the town.

A $2,000,000 airport is to be built on the east side of Cleveland by the Cleveland Heights Air Terminals, Inc.

Amarillo's (Texas) new Municipal Airport was dedicated September 7-8 with a gigantic air derby. The field is 480 acres and is completely equipped for day and night flying.

Harry F. Knight recently opened a private airport on his ranch near Denver.

CHANGES

The United Aircraft and Transport Corp. have arranged the incorporation of the Northrop Aviation Corporation which will take over the assets of the Avian Corporation of Los Angeles. It is reported that United is seeking to buy the Standard Steel Propeller Corporation of Pittsburgh as well as the Douglas Aircraft Company of Santa Monica, Cal.

F. B. Rentschler, president of the United Company, and Lloyd Stearman, head of the Stearman Company of Wichita, have issued a joint statement announcing the merger of the Stearman Aircraft Company with the United Aircraft and Transport Corporation.

The Continental Aircraft Engine Company has been incorporated as a subsidiary to Continental Motors Corporation for the purpose of manufacturing and developing aircraft engines.

The factory of Wallace Aircraft Co., Inc., of Chicago has been moved to Fairfax Airport, Kansas City, which is the home office of its new parent company, the American Eagle Aircraft Corporation.

The Wright Aeronautical Corp. are quoting a list price of $1,600 on the Wright Gipsy engine, F. O. B. St. Louis, Mo., including their standard equipment.

ARMY & NAVY

The Navy survey ship "Hannibal" is surveying an area half-way between New York and Bermuda to determine the feasibility of anchoring artificial islands on the Atlantic for the landing of airplanes. This survey is being made for a commercial company proposing to establish a trans-Atlantic airplane service in relay hops.

The Secretary of War has directed the Chief of Air Corps, Major General James E. Fechet, to initiate a study with a view to the development of light camping and messing equipment which can be carried by air.

Fast navy airplanes recently made successful landings at night on the illuminated deck of the U. S. S. Saratoga, while the huge airplane carrier was steaming through the Pacific off San Pedro, Calif.

Westside T. Larson, Air Corps, with Lt. Lawrence J. Carr as co-pilot, flew from France Field, Panama Canal Zone, to Kelly Field, San Antonio, Texas, in one day (2,030 miles), July 11th.

Lt. Commander A. I. Price has been assigned to sea duty by the Dept. of the Navy. Commander Price will assume command of a patrol plane squadron attached to the aircraft tender "Wright" in the Scouting Fleet.

The U. S. Naval Base at Sumay, Guam, after experimenting to determine the type of auxiliary vessel best suited for aviation crash boats, have found that none of the boats were equal in performance to the sea sled.

FOREIGN

A Swiss engineer has invented an apparatus called the "Meteor," which will permit of the delivery of small packages of mail from a plane in flight. The apparatus consists of an aluminum shell equipped with a precision watch. A waterproof sack is attached under the shell, and at the top of the shell a small parachute lies folded in a frame. The weight of the apparatus is 3.6 kilograms. It can carry a weight of 4 kilograms. When flying over the point at which mail is to be dropped the pilot may adjust the precision watch according to the indications on the altimeter and throw the carrier overboard. The carrier falls like a dead weight until about 100 meters above the earth, when the watch releases the parachute and the package lands slowly at the spot aimed at. A larger model of the apparatus has been developed which will permit of the lowerage of weight up to 66 pounds.

A four-hundred-acre tract of land surrounded by fifteen hundred acres of industrial property has been purchased by the Elandsfontein Estates Company, which will co-operate with the Rand Refineries, Limited, and the city of Germis-

[*Continued on page 46*]

Learning to Fly Commercially

Its Financial Hazards Discussed

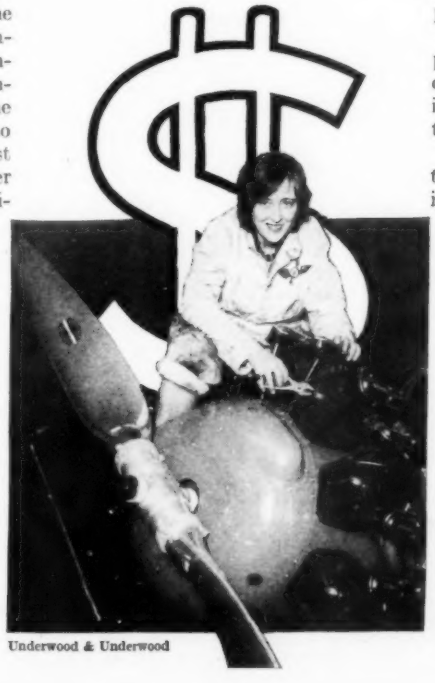
By Aro E. Maharg*

AVIATION had lain dormant with hardly any perceptible impetus until Colonel Charles A. Lindbergh completed his epochal flight to Paris. The world was left gasping with the audacity of this seemingly impossible feat. The population of two continents, thrilled at the future of Aviation, became "airminded" over night. No amount of Aviation publicity, deeds or spectacular events accomplished what, in the space of 36 hours, Lindbergh did. Tremendous strides in every aviation line were made within a very few months. Aviation became the "dream Mecca" of countless thousands of the world's younger population not to mention the many enthusiasts who were well along in years. Institutions of learning inaugurated various courses pertaining to aviation. Even High Schools and Grade Schools, however remote from the hub of civilization, had their aviation courses within a short period of time. Aviation, through the medium of the many numerous aviation magazines and papers, reached into the innermost depths of the country. The youth of the country became fired with enthusiasm and the desire to emulate Lindbergh within the shortest possible time. The blasé city dweller was no less enthused. What enthusiasm! Everybody from the Bootblack to the Bank President wanted to become a "Pilot."

Hundreds of Flying Schools sprang up throughout the United States. Some were good. Some were bad and some were Schools in name only. The majority fell under the latter category. An extensive advertising program was inaugurated. The main theme in their Opus was, "Let US Teach You to Fly." This was what the public had been waiting for. The demand for trained Aviators was enormous according to their information. An initiatory course in Flying was all that was necessary to permit one stepping into a commercial position extending an astonishing financial remuneration.

And so these would-be aerial argonauts dashed off to the nearest aviation school with a limited amount of "coin of the realm," which, in the majority of cases, did not exceed $300.00 and in most cases represented their savings for considerable time. They expected to become full fledged pilots with aerial experience of from twenty to thirty hours. Had not the School promised them they would?

The illusion was soon shattered. Ten hours' dual training soon ate up this insignificant sum and the student was left "stranded." Here was an individual with ten hours' training, sufficient to enable him to distinguish ailerons from tail surfaces, when he had expected to become a Mail Pilot with the same amount of training. The result?—a bitter and disillusioned student. The inevitable happened. The student packed his helmet and goggles and returned home. Aviation had lost one sincere "booster."



Underwood & Underwood

While the public has become airminded within a very short time, which to aviation is of the utmost importance, they also have been lax in realizing the extremely high cost of training. The consensus of public opinion seems to be that almost anyone can learn to fly with only a few hours' training. This is quite true, but with what degree of efficiency?

To become an aviator of sufficient skill to permit one to step into a position paying, say, $5,000.00 a year, entails the expenditure equal to the amount a college man spends during the course of his tuition. This, I know, sounds rather absurd but is an undisputable fact.

Too many schools are inclined to paint the path of aviation as an easy one and infer that the cost is very nominal. This is a serious drawback both to the student and the Industry.

The average cost in the many schools that the writer has come in contact with is $30.00 per hour. A minimum of ten hours' dual instruction and ten hours' solo instruction is compulsory. At the completion of this training the Student is supposed to be sufficiently skillful to pass the Department of Commerce tests for a Private Pilot's License. This license permits the holder only to fly an airplane for private use. It does not permit him to engage in commercial ventures, therefore, a very small income, if any,

[*Continued on page 78*]

** The writer, who is an executive in one of the better known flying services, utilizes this rather strange nom de plume, with the natural desire of a busy man to preserve himself from the flood of argument and combative replies which will naturally follow.*

In reference to Mr. Maharg's article we wish to say that the advertising of all schools accepted for publication in AERONAUTICS is carefully scrutinized for accuracy of statement. In addition no school is accepted which does not state its rating by the Department of Commerce, or the fact that it has applied for rating.

BRIEF NOTES OF THE MONTH—[*Continued from page 44*]

ton in the provision of an airport which is expected to serve as a terminal for an Imperial air mail service from England to South Africa, which is expected to be inaugurated shortly. It is said that the airport should become the air center for refined gold destined for Europe and India, and an important center for other air traffic.

The Mexican Govt. has granted concessions for three air services to Eduardo Meade, who will operate from San Luis Potosi as his central point. One route will be from San Luis Potosi to Matamoros via Tula and Ciudad Victoria (545 kilometers), the second will be from San Luis Potosi to Manzanillo via Leon and Guadalajara (516 kilometers), and the third from San Luis Potosi to Piedras Negras via Zacatecas and Torreon (943 kilometers).

To exterminate the Hemlock Looper, a caterpillar which is destroying the foliage of hemlock trees over large areas in the Indian River district, a plane will be used from which to dust calcium arsenic. A specially constructed hopper in the bottom of the plane has been prepared and it is hoped that success similar to the results obtained in other parts of Canada and other countries will be obtained.

Netherland East Indies reports that during the six months ended May 1, 1929, the aircraft employed in regular air services flew 191,957 kilometers. Of the 1,480 flights, 1,230 were regular service flights. A total of 6,002 passengers were carried, 3,639 on the Bandoeng route, 847 on the Semarang route and 1,516 on special flights. A total of 50,000 letters, over 300 per day, were carried.

The Latin American Air Transport Co. has announced its intention to inaugurate service from Mexicali to the Guatemalan border, via Mexico City. Other projects for air lines are under way, including one from San Luis Potosi to Ciudad Juarez.

The Lot Airlines Company of Poland, which was formed a few months ago to take over all commercial flying in Poland, completed 2,700 successful flights during the first six months of its existence, carried 5,420 passengers, 30,800 lbs. of mail, 343,200 lbs. of merchandise, and traveled a total of 356,250 miles.

New Zealand. The Minister of Defense announced recently that for a No. 1 airport rating in addition to basic requirement the landing field must have a landing area of 800 yards in all directions with clear approaches. Only one airport is eligible for this rating.

The Soldenhoff LF-5, the new German "foolproof" plane is tailless with an engine at the rear. It is equipped with a 30-horsepower engine, with a top speed of 70 miles per hour and a low landing speed of 12 to 17 m. p. h.

The Latin American Air Transportation Company operate a mail, passenger, and express airline between Los Angeles, Mexico City, Guatemala City, San Salvador and Tegucigalpa, Honduras, over the longest Mexican airline in operation. Tri-motored American planes are used.

German Lufthansa shipped a plane some time ago to Iceland to be used for local air transportation. This failed to prove remunerative, and the plane is now being used for locating fish shoals. It is reported to be the only plane in Iceland.

The Icelandic Aviation Company, Ltd., have leased 2 Junkers "f-13" planes from the Luft-Hansa Company in Germany to be used for establishing passenger and mail routes in Iceland and scouting for herring during the season.

Aeroposta Uruguata, a Uruguayan corporation, has requested the Uruguayan Government for authorization to establish an air mail service in that country with a government subsidy of one-third of the expenses.

A temporary airport will be established on the outskirts of Surabaya in Java. This will be for the use of the Fokker machines used in the civil air service between Batavia and Semarang.

Stoke-on-Trent, England, City Council has sanctioned the purchase of land costing approximately $57,000 for a Municipal airport. It is planned to lease the port to the National Flying Services, an operating company.

The Guatemalan government has recently started a passenger and mail air line between Peten and Guatemala City to encourage the establishment of commercial aviation in Guatemala.

Progress in British experimentation with a crude oil motor has reached such a stage that engineers are planning to attempt a trans-Atlantic flight with a plane equipped with such a motor.

Wilhelm Romeisen, Berlin engineer, has developed a new type of Diesel motor which is said to be much superior to both the Packard and the Junkers heavy oil burners.

The government of Panama plans to purchase two landing fields, one at David, 1,200 by 800 meters, and one at Pacora, 20 miles from Panama City.

Eight American planes will be employed in the Chilean government air service which carries mail between Santiago and Arica. These planes will replace the "Moths" formerly used.

Spain. At the present time there are emergency landing places at intervals of about fifteen miles along the entire 250-mile route between Madrid and Seville.

An airplane which can be launched from the deck of a submarine has been successfully tested, according to a report from the British Admiralty.

Argentina. Recent dispatches report approximately twenty regularly equipped airports. Almost the whole of Argentina is a natural flying field.

The Cia Mexicana de Aviacion, S. A., is establishing a chain of radio stations along its flying routes in Mexico and is also planning to equip all passenger planes with radio.

The Canadian Aeronautical Chamber of Commerce has been recently formed at Montreal by 35 representatives of aircraft interests in the Dominion.

An airplane factory is being constructed in Mexico City, near Valbuena which will build both military and naval planes.

Italian government airports have been placed at the disposal of private airplanes, both of national and foreign registry.

Bolivia and Paraguay have agreed to settle their boundary dispute in the Chaco by means of an aerial survey.

The Norwegian flyer, Gunnestead, has purchased a plane and proposes to establish a flying school at Oslo.

Mexico City National Bureau of Aeronautics is constructing a large civil airport, 1,800 by 800 meters, at a cost of $500,000.

DISTRIBUTORS

W. T. Pender, president of Pender Aircraft Corp., distributors of Ryan monoplanes in Texas and Oklahoma, is holder of a new Ryan sales record. During the last three months, Mr. Pender sold Ryan monoplanes valued at $92,750.

The Mid-West Co., agents for Travelair planes, have been appointed by the Bloxham Aero Supply Co., Chicago, as distributors of the Bloxham Safety Sticks in the states of Nebraska and Iowa.

The Standard Steel Propeller Company, Homestead, Pa., have appointed the sales division of Universal Aviation Corporation at Lambert Field as their distributors in that territory.

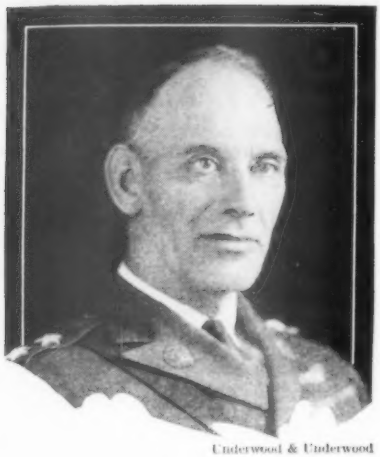
George E. Kelly has been appointed New York distributor for the Argo biplane manufactured by the Alliance Aircraft Corporation.

LEGISLATIVE

An Aeronautics Trade Division has been established as a commodity division of the Bureau of Foreign and Domestic Commerce, to make possible the expansion of the aeronautic work formerly taken care of in the Aeronautics and Communications Section of the Transportation Division. The new division will act as the liaison organization between the district, co-operative and foreign offices of the Bureau, and the Aeronautics Branch of the Department of Commerce, as well as aiding in the promotion of foreign sales of aeronautic equipment. The division will also continue to supply information on foreign aeronautic development.

After Sept. 1st, pilots will secure licenses only for plane types for which they qualify. Under the new rules, the

[*Continued on page 68*]



Underwood & Underwood

Army Flight Training

The history and present status of army flight training is given here in graphic vein.

By

MAJOR GENERAL JAMES E. FECHET

Chief of the Air Corps

IT is now twelve years since the Army has gone into the intensive training of flyers. The entry of this country into the World War had the effect of causing this engrossing activity to spring up overnight. The Allies demanded airplanes and pilots, and it was simply up to America to supply this demand despite the fact that it was hardly prepared to do so.

The outbreak of the war found the Aviation Section of the Signal Corps with a commissioned personnel of but 65 officers. Among this mere handful of men were some very skillful pilots, but the exigencies of the period demanded that they be placed in executive and key positions in this country as well as overseas. It was clearly out of the question to utilize any of them in the capacity of flying instructors. And so in the first few months of the war the aviation branch of the Army was forced to rely almost entirely upon civilian flying instructors to train ambitious young men anxious to serve their country in a combatant branch of the military service which presented a particular appeal to them. How great this appeal proved to be may be deduced from the fact that by the time the Armistice was signed the aviation branch of the Army had grown to such proportions that its commissioned and enlisted personnel constituted an organization exceeding the pre-war strength of the entire Army.

The dearth of flying instructors at the beginning and for several months subsequent to the outbreak of the war was gradually overcome as students graduated from the various flying schools which had been established throughout the country, and those graduates evincing adaptability as flying instructors were assigned on such duty. Students who received training in this country during the war were only taught to fly the training type of ship, the old Curtiss "Jenny"; those who were sent overseas with the ultimate object of engaging the enemy on the front lines attended advanced flying schools or instruction centers in France, Italy and England and were taught to fly pursuit, bombardment or observation planes before they were assigned to combatant squadrons.

At the cessation of hostilities the United States was faced with the unusual situation of possessing a superabundance of young aviators, many of them highly trained and skillful military pilots. To retain them on active duty was out of the question, since no provision had been made for the Air Service as a permanent combatant branch of the Army. It was also foreseen that, even were provision made by Congress for a separate aviation branch, its peace time strength would be but a fraction of its expanded war time strength. The natural result was that honorable discharges from the Army were carried out by the wholesale until what may be termed a skeleton organization remained. When Congress in 1920 passed an amendment to the National Defense Act, creating the Air Corps as a combatant branch of the Army, examinations were held in the summer of that year of those men who professed a desire to be permanently commissioned therein. Even at this late date, however, the commissioned personnel of the Air Corps does not measure up to the authorized strength.

Despite the continuous discharge of commissioned flying personnel, as well as enlisted men, from the time of the signing of the Armistice until the close of the year 1920, flying training activities were carried on, although on a greatly reduced scale. It was foreseen that, in the event of another war emergency, the same old story would be re-enacted of utilizing the Regular Army merely as a nucleus for the expanded war strength Army to follow. The World War furnished a bitter lesson, and the War Department was fully determined to profit thereby.

In November, 1918, America was fully prepared for war, with the machinery well oiled to send a constant stream of trained flyers overseas. With the Dove of Peace again hovering overhead, how-

Underwood & Underwood

Miss Mary Fechet, lovely sub-deb daughter of the General, who is also an aviation enthusiast. Her fund of flying knowledge is unusual and growing

ever, it was realized that the large majority of the war time flyers, going back to civil occupations, would in a few years lose touch with the flying game and their usefulness to the country would dwindle as the years went on. War-time emergency officers who were discharged from the Army were given commissions in the Reserve Corps, but the Air Corps Reserve presented a somewhat different problem than the other branches of the Army. Flying is essentially a young man's game, and to be proficient in the art constant practice is necessary. The practice of Reserve flyers going to the comparatively few flying fields which remained in operation in order to obtain flying practice was encouraged, but it was appreciated that only a small percentage of them would be able to avail themselves of the opportunity. The battle of life is a paramount issue, and very few men in the business or professional world can afford to divert even part of their valuable time to keep themselves fit for military duty.

Underwood & Underwood

Kelly Field—A good mass view of the students' barracks

It was with these considerations in mind that the Air Corps continued to operate several flying schools and encouraged applications from qualified young men for appointment as Flying Cadets, their reward upon graduation being a commission in the Air Reserve. It was felt that a constant flow of trained young flyers into the Reserve would prove a great boon to the country in time of need.

For a few years following the close of the war, primary flying schools were maintained at Carlstrom Field, Arcadia, Fla., and March Field, Riverside, Calif., with Advanced Flying Schools at Post Field, Fort Sill, Oklahoma, and Kelly Field, San Antonio, Texas. The necessity for further economy in the administration of the Army tended towards a continuance of demobilization measures, with the result that the effects thereof were felt in flying training carried on by the Army to the extent that the schools at Post and March Fields were closed. It was decided to concentrate flying training activities at San Antonio, Texas, and this led to the abandonment of Carlstrom Field and the removal of the Primary Flying School to Brooks Field. Kelly Field was designated as the school for all advanced flying training. These two schools are still in operation, as is also March Field, which was re-established as a Primary Flying School in the latter part of 1927 following the passage by Congress of the Air Corps five-year expansion program.

The year 1927 was a notable one in the history of American aviation, the many outstanding aeronautical achievements that year, among them the trans-Atlantic flights of Lindbergh, Chamberlin and Byrd, the Hawaiian flights of Lieuts. Maitland and Hegenberger and others causing an unprecedented interest in aviation. Both military and commercial aviation benefited by this revival of interest. One needs but pick up a current issue of some of the prominent aeronautical magazines and compare same with issues published in 1926 to appreciate the great change which the aeronautical industry has undergone in the short space of two years.

The growing air-mindedness of the American public caused its influence to be felt in the Army Air Corps in more ways than one, but since the subject I am dealing with is flying training, it is significant to remark that the Air Corps at the present time is able to approve only a fraction of the vast number of applications from young men all over the country who desire to obtain flying training at the Air Corps schools. This sudden wealth in applications for cadet appointments has enabled the Air Corps to change its policy with respect to the acceptance of same and to exercise much greater discrimination in the selection of candidates deemed qualified for such appointment.

Insufficient accommodations at the two Air Corps Primary Flying Schools rendered it necessary to limit new classes at both of them to about 110 students each. New classes are entered every four months—March 1st, July 1st and November 1st, which means that, with graduation classes of 100%, over 600 students would graduate from the Primary Schools each year. However, only about sixty per cent of those students who start the course are able to keep up the pace during the eight months' grind, and so by the time the Primary School graduates pass through the additional four months of intensive training at the Advanced Flying School at Kelly Field, approximately half the number of those who started flying training receive their "wings."

There is no such possibility as merely slipping through the Army Flying Schools. When a student graduates from the Advanced School, he is an aviator in every sense of the word. There is no element of doubt as to a graduate's ability to pilot a military airplane. During a student's career at the Army flying school he is always under the close scrutiny of his instructors. If any weaknesses crop out in his flying, he is checked up by several instructors and, if he evidences inability to correct his faults, he is eliminated from further instruction. "Natural aptitude" is a byword at the Army flying schools, and lack of it has dealt disappointment to many an aspirant for the much coveted "wings" of the Army.

The Air Corps does not believe in taking chances. It holds that human life is very dear to everyone and that it is folly to permit a student to continue his training when it just isn't in him to become a military flyer.

The flying training system used by the Army is about as thorough as human brains have been able thus far to contrive. The system is the result of many years of painstaking and constant development. Today it stands as a model system, known the world over, and patterned after by commercial flying schools now springing up in various sections of the country to fill the needs of commercial aviation.

The Air Corps has fully profited by past mistakes. There have been casualties in flying training in the early years of the flying schools, but these have been reduced until now a fatal accident in training is exceptionally rare. With gradual improvement in instruction methods and the procurement of new and up-to-date training ships, it is but natural to expect such progress.

Flying instruction in the Air Corps is confined to the Air Corps Training Center, under one head. The system of imparting instruction has been standardized, and during the past two years the instructors themselves have had to pass

[*Continued on page 84*]

Crackups and the PRESS

By
JOSEPH H. DYSON

When Lieutenant Benson Hoy put the newspapers "on the carpet" for the manner in which they featured flying accidents, he started a warm battle. Last month Francis Walton, aviation editor of the New York Herald-Tribune, took up the newspaper's side; and this month Joe Dyson, aviation editor of the Worcester, Mass., Gazette, finishes the daily press' counter-offensive.*

COLONEL HALSEY DUNWOODY, chief of supply for the A. E. F. Air Service, during the World War, talking to the first aviation business school in Chicago the other day said, "Aviation is suffering from a bad attack of growing pains."

Of those growing pains, Lieutenant Hoy's article on *Pilot Trouble* versus *Engine Trouble,* in the June issue of AERONAUTICS, is a symptom. He takes to task the newspapermen for their stories on various crashes, and classes the accounts as "an effective amount of misleading newsmatter." He says the reporters attribute crashes to almost any cause than the one chiefly responsible, "pilot trouble."

Perhaps he hit the nail on the head when he characterized it as "pilot trouble." And he, himself, according to his own statement, has been responsible for pilot trouble on more than one occasion.

From the angle of the newspapermen, pilot trouble ought to be eliminated, both Lieutenant Hoy's type, and our classification under that title. "Pilot Trouble," to the average reporter means "trouble with the pilot," a deliberate attempt to dissimulate and to minimize a crack-up. It is almost safe to say that there is not a pilot flying today, who would give a newspaperman the true account of any air accident in which he was the pilot or passenger. "What happened?" is always the first question. And what is the answer, nine times out of ten? "Motor conked!" Just that. Granted that pilot trouble is the cause of the majority of crack-ups, how many pilots will admit they have been at fault?

It has been my experience on virtually every occasion, that a deliberate attempt was made to hide the facts, and wherever possible, to prevent the publication of any account of the crack-up. To keep an airplane accident out of the newspapers is impossible. Even with the automobile as popular as it is, there isn't a day passes that there are not several stories of crashes, in which one or more persons were injured. Ergo, with airplanes still more or less of a novelty, what chance is there of keeping out the story of an air accident?

That chance is slim. Then, what to do? The logical procedure would be to give the reporter as clear and concise an account of the affair as rapidly as possible. Bear in mind, he has an edition time, which is as strict to him, as his schedule is to a mail pilot. Hence, speed is essential.

But, what happens the minute a crack-up occurs? Immediately the word goes around the field, "Don't let in any newspapermen. Keep the reporters and cameramen away." A guard is thrown around the wrecked ship, and in some cases, around the entire airport, to keep the newspapermen away from the scene of the crash. Does that make for cooperation? Does it make for pleasant relations between planes and the press? Judge for yourself.

And bear in mind that a reporter is not a technician. He is required to have a working knowledge of many subjects, but thus far, aviation has entered into his scheme of things only occasionally. When, as, and if, you do tell him the story of a crack-up, do it in as simple language as possible. Then both he and the American Public are more likely to understand just what caused it.

Lacking proper and authentic information, the reporter must perforce write what he sees, or what some bystander has seen. Eye-witnesses at best are unreliable, and the sight of a plane dropping from three or four thousand feet inspires even the hardest of us with horror. What then of the youthful newsgatherer, impressionable, bursting with desire for a good story? Headlines, bold-face type, adjectives and everything!

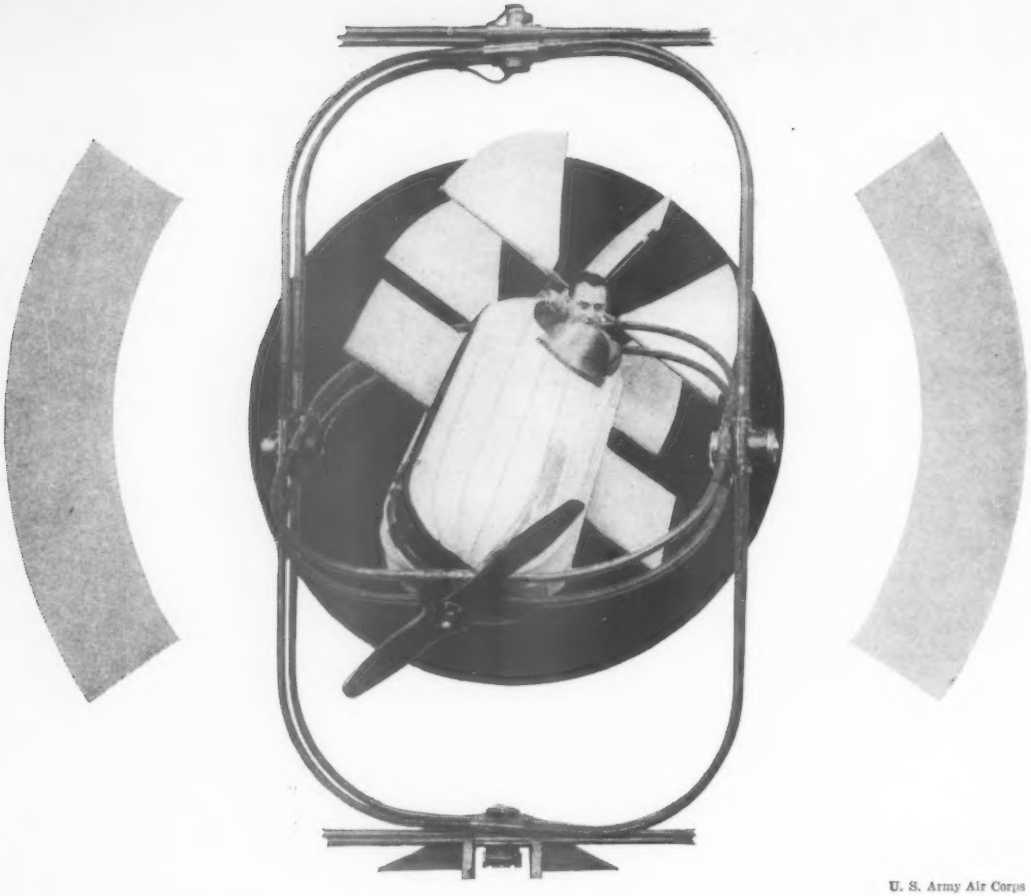
How much better it would have been had the pilot taken him to one side and

[*Continued on page 82*]

Underwood & Underwood

A reprint of a recent sensational headline. The presses are of cylinder type

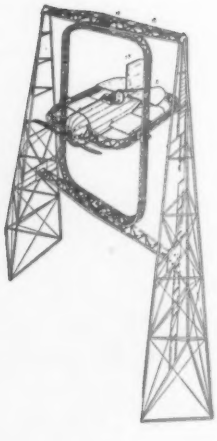
* On the whole we still agree with Hoy, although there is much in what this article says.—Ed.



U. S. Army Air Corps

THE MECHANICAL "FLIGHT TUTOR"

By S. R. WINTERS



SIMULATING, on a miniature scale, the actual conditions of flight in an airplane of standard design, the Air Corps of the United States Army has devised and built a model flying machine for training prospective pilots. Given the intriguing name of "primer plane," it enables students of aerodynamics to experience the thrills and to secure the knowledge of flight, minus the hazard of upper-air ascension when undertaken by novices and inexperienced pilots. This contraption permits of flying in the laboratory and on the ground—as paradoxical as that may seem.

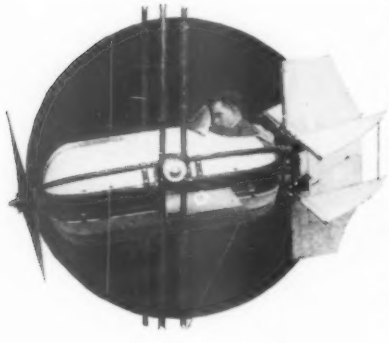
The Ruggles orientator and the more recent machine for testing the mental reaction of aerodynamic students to certain problems of airplane control, represent ingenious efforts to duplicate flight conditions in the laboratory. These contrivances, however, do not embody the necessary training for pilots within a single mechanical unit. The newly introduced "flight tutor"—a plane in miniature—represents an ambitious effort to include the varied experiences of actual flight and to confront the pilot-in-the-making with the manifold problems of airplane control.

The primer plane—taking its designation from the school days of the Blueback Speller and the reading primer—is, structurally, a faithful imitation of the larger model of flying machine whose lessons of flight it would inculcate in the student. There are, for instance, the conventional fuselage body —on a reduced scale—with a rudder, an

THIS machine differs from the Ruggles orientator and similar training devices in that it simulates faithfully all of the experiences encountered in actual flight. . . .

elevator, and the usual aileron control surfaces. The latter are subject to movements under the impetus of airplane controls—and these, too, faithfully simulate those of standard design. The miniature plane may be detailed on a flying expedition—on the ground and in the laboratory—in the slipstream of a tractor propeller. This derives its motive power from a 15-horsepower electric motor, which is incorporated in the forward portion of the fuselage and in this way it is installed in a position corresponding to that of the engine in an honest-to-goodness airplane.

This "mechanical airplane instructor," in its entirety, is mounted in a double-tripod frame, twenty feet high. This elevated position, while in reality is not far removed from terra firma, does in the imagination of the pilot in training convey a degree of altitude and a certain horizontal view not imparted from



a strictly ground elevation. The instrument board on this mechanical flight tutor faithfully represents that of a conventional flying machine—including airspeed indicator, compass, bank and turn indicator, clock, tachometer, and later miniature models will undoubtedly incorporate the Bureau of Standards' steel vibrating reeds for visually guiding an airplane by signals from a directional radio beacon. This instrument board, as now constituted, is sufficiently comprehensive to teach the prospective pilot the habit of consulting these more or less automatic devices when in doubt as to the course or safety of flight.

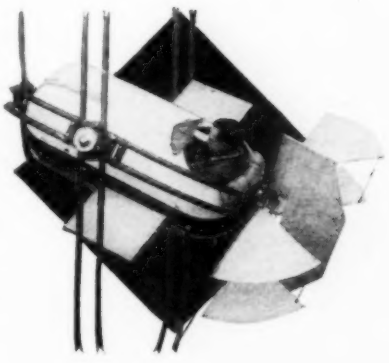
With this horse-tied model of an airplane, the pilot in training does not have to jeopardize his life in actual flight before experiencing the thrill and gaining the knowledge of the functions played by his feet on the rudder and his hand on the control stick. Then, too, this miniature airplane "flying on the ground" imparts such preliminary experiences as a rush of air, the noise of the propeller, and the rocking and tipping motions, and even tail spins of aircraft in actual flight. Meanwhile, the student is familiarizing himself with the controls without the usual menace of tail spins and stunt maneuvers when an inexperienced pilot indulges in them. He learns the art of flying gradually and without the confusion of manipulating a number of controls simultaneously at an altitude that of itself is staggering to the novice.

While the pilot-to-be is receiving practical training from the so-called primer plane, the instructor representing the human equation is noting the mental reactions of the student. This observation involves a study on the borderland of psychology and physiology—to determine the mental and physical fitness of the student to become a pilot. Physical examinations by Dr. L. H. Bauer of the Aeronautics Branch of the United States Department of Commerce have indicated that there are physical defects not readily perceptible upon preliminary physical examination which disqualify a person as a successful pilot. These defects are disclosed in the mental reactions of the student when subjected to such training as given by this mechanical flight tutor. Also, by enlisting the student as a member of the "hooded order"—that is, placing a hood over his head—he may be taught blind flying.

The Air Corps of the War Department suggests a possibly wide-spread use of this mechanical trainer of pilots—lending itself to adoption by units of the National Guard, the Air Corps Reserve, and similar government organizations, as well as commercial schools and companies engaged in the training of pilots. Pertinent to the introduction of this primer plane is an authentic observation that more than half of all aircraft accidents are attributed to pilots. The National Advisory Committee for Aeronautics and the Assistant Secretaries of Aeronautics of the Department of Commerce, War, and Navy, are in agreement as to the preponderance of airplane crashes due to pilots. Ill-advised landings and tail spins are the errors most commonly committed by pilots and while training may not curb these daring stunts the primer plane will aid in the correction of blunders and fatal errors now due to inexperienced pilots.

The mechanical flight tutor, if admitted to the wide-spread adoption it apparently deserves in training quarters, should occupy in the human equation a position corresponding to that of the wind tunnel in studying, on a miniature scale, the mechanical behavior of airplanes in flight. The wind tunnel occupies a secure position in aerodynamics and, we are told by aerodynamic engineers, that the recently introduced photographic method of studying aircraft structures is not likely to dislodge the tunnel from its supremacy as a test medium. Dr. H. L. Dryden, Chief of the Aerodynamics Section of the Bureau of Standards, points to instances where a disregard of wind-tunnel studies have caused airplane designs to come to grief, both in flying personnel and material. Similarly, the Air Corps of the War Department believes that its new test instrument in the human equation—the primer plane—is destined to occupy a position of importance in training pilots.

In this era of sport flying natural adaptability will largely govern the ability of business men and others who are anxious to pilot their own planes. AERONAUTICS will start in the next issue a series of articles on other angles of physical adaptability and standard tests of reactions as worked out by the best authorities.—Ed.



BOOKS OF THE MONTH

AERONAUTICS will be privileged to give information concerning books and publications relative to any phase of aviation on request.

THE "Bahgdad Mail," by Hill, recently published by Longmans, Green and Co., is a readable volume consisting of reminiscences and experiences of the author during his years in Arabia. He has somehow managed to invest the monotony of flying back and forth over what is probably one of the most uninviting deserts of the world, with a degree of charm that is a continual surprise. His own particular names for the landmarks show him to be a man of imagination—otherwise we cannot suppose he could have conceived the book.

The British faced troubles enough in establishing this route over the desert of Arabia. The wandering tribes, sometimes friendly, but always mischievous, have a habit of using beacons and other lights as targets for rifle practice. Gasoline caches have to be sunk deep and hidden from sight. In the days when petrol was stored in the usual five gallon tins that are familiar in even the remote corners of the earth, these tribesmen raided the caches regularly—not for the gasoline, which they poured out on the sand, but for the sake of the coveted tins.

Like all successful authors of travel works Mr. Hill has managed to convey more than a little of his own personality in this work, which adds to the charm of what looks like a formidable volume, but proves to be so well balanced that the reader lays it down with regret. May we hope Mr. Hill removes to another route and writes of that, too?

JUST as the various British aeronautical magazines had praise for the last issue of our "Aircraft Year Book," so should the magazines of this industry compliment Squadron-Leader C. G. Burge for the splendid publication which he founded and edited—"The Air Annual of the British Empire."

In the first place the size of the book is a revelation, for it is over 700 pages, not including many pages of inserts in photogravure, monochrome and color. Those of us who somehow insist on thinking of this country as England are brought up sharply at the realization of empire—an enormous geographically unconnected stretch of possessions, dominions and dependencies that offer a most remarkable field for aviation enterprise.

The volume deals with empire and service aviation, civil aviation, with due regard to the economics of transport, followed by several sections devoted to aviation in the possessions and dominions, Africa, Australia, Canada, India and New Zealand. Separate chapters are given to photography and Flying Clubs, and more than half the book is given over to the British Aircraft industry. The manufacturing companies are reviewed, specifications of their products given, and, as the latter section stands, the work represents a current encyclopedia and directory of the British aeronautical industry.

THE Ronald Press has issued another book in its Aeronautic Series — "Aviation, Its Commercial and Financial Aspects," by Richard Rea Bennett, assistant Sunday editor of "The Sun," Baltimore. ($3.00.)

As the author points out, the critical attention of bankers, investors, lawyers, engineers, scientists and hosts of laymen has been turned upon this vast industry, into which over a billion dollars has been poured. There are financial and commercial problems, aside from the scientific ones of the industry itself, which require investigation and correlation, so that weaknesses may be revealed and strength recognized.

Observers are almost at one in agreeing that prevailing high rates are an obstacle to the development of greater business. Mr. Bennett endeavors to show that for the present these rates will have to be maintained, unless companies are willing to assume deficits. Air transport, says the author, must remain, perhaps for some time to come, in the class of special service, offer greater speed at a somewhat greater cost. Ultimately this will be greatly modified as the increased scale of operations brings down the cost.

This observation is strictly in line with the developments of the past few months, which have taken place after these comments were written. The recent great mergers show that the industry is tending toward large consolidations with the economies they will bring.

The warning issued by Mr. Bennett about over-financing deserves emphasis, and an extract from that chapter is not out of place. "Investment funds are being invited into the field from many points, although the feeling exists that there is grave danger of capital being raised beyond immediate needs. This would duplicate the unfortunate experience of the middle of the last century when the railroad systems were all but sunk through overfinancing. Conservative bankers are warning the more enthusiastic investors that aviation can only grow so fast as the demand for aerial carriers increases."

A SECOND edition of "The Book of the Aeroplane," by Captain J. Laurence Pritchard, has come from the press of Longmans, Green & Co. ($3.00). The historical section of the previous editions has been cut down somewhat and brought up to date, and more space is devoted to how the airplane flies, how it is constructed, what it does and the necessary organization to enable it to leave the ground in safety. Separate chapters are devoted to the usual subjects of engines, races, war, the future, and others of like character. Altogether a pleasing book for the novice, and somewhat British in treatment.

ANOTHER Ronald Press book is on sale, "International Airports," by Lt. Col. Stedman S. Hanks. ($5.00.) It is a consideration of the various problems of American airport development made from a study of what has been done abroad. Colonel Hanks made an extensive tour of European airports for the purpose of learning in what ways their experience can serve as a guide for airport construction in the United States.

The information given by the author is not general, it is specific and application to conditions in this country should not be hard. Suggestions are given for making airports profitable, regulations and restrictions are included, and, in short, the book offers a short course in the economics of this subject to airport managers.

Lady Heath, famous for her remarkable flight from Capetown, Africa, to London, England, is now located permanently in America. Her review of Women's Activities will be a permanent monthly feature and will be found elsewhere in this issue.

A Pilot's Wife Speaking

By Nelle F. Dooley

MORE or less discussion is continually arising as to the place of women in aviation. AERONAUTICS has full faith in the final equal participation of women in this great art, and will run regularly for the ladies specific material of direct interest to them.

ONE reads and hears so much opposition concerning women flyers that I am prompted to write my experiences both as a pilot's sweetheart and later his wife.

Very few pilots, especially those of the old school, the army days, ever endorse the idea of women flyers, most of them are downright against it. My husband was one of the army boys, and considered by all who knew him as "an artist at the controls." He was very bitter to the idea of women invading the one thing that should be left entirely to the men—the business of being a pilot. After his discharge from the army he was doing private flying for an independent oil company.

It was there I first met him. Often I would ask him to take me up with him; always he would promise yes. But when I would go out to the field there was some reason that I could not go—the air was too bumpy, or the ship wasn't tuned up properly or the trip was too long, it might make me sick. So the months passed and I had never "been up."

There were so many reasons and excuses for my not flying with him that finally I learned to be afraid of aeroplanes myself, and in the end I coaxed him to give up flying. After a year or more had passed I learned that I had committed a very grave mistake, so I wrote him and advised him to take up flying again and never leave it. This he did, and up until his death, a few months ago, I think he lived flying and dreamed flying, but never quite happy except when in the air. Incidentally, it is well to state here, that with all his years of hard flying, all the hours he had in the air, he did not die in a crash. His flying was perfect to the end.

Early one spring I coaxed a friend to take me up for a ride; he said my reaction was perfect, though he tried hard to give me a thrill so that I would forever abandon the idea of wanting to fly. He also belonged to the great army of men who do not believe women should invade the air game. This trip only made me all the more anxious, so I wrote the man, who was later to be my husband, that he must teach me to be a pilot. He promised that he would. He said that I would make a good pilot as he had watched me handle my car; that even in the most extreme crisis I never for a moment lost my head, or my sense of reasoning, that I acted first, which was the first requirement in being a successful pilot.

Last spring we were married. Then I had occasion to go on many trips with him, as he was a transport pilot on one of the large air-passenger lines through the south. On several occasions we would make solo trips. The trip had to be made, regardless of passengers, and the south is not as air-minded as it should be (though they are getting more so each day) so, frequently there would be trips made sans passengers. On those occasions (he was flying one of those six-passenger monoplane types used extensively in passenger transport work) he would allow me to handle the controls to get the feel of the ship. I became quite expert at handling the ship while in the air, though of course I never tried to take-off nor land.

Later in the summer we went to Houston where he was engaged mostly in instruction work, using a small three-passenger biplane type.

Here he decided he would cure me of my desire to learn to be a pilot, so one beautiful day he took me for a long ride over the bay into Galveston, then back, following the canal that led from the deep water-way into Houston. The motor missed and trouble started. We had a forced landing in rather a bumpy pasture.

This did not seem to excite me as he had hoped it would. He soon tuned the motor off and we were ready for the take-off. He asked me if I had

[*Continued on page 95*]

Marjorie Crawford of the increasing army of women pilots

THEY TELL US—

A Forum of Comment, Criticism and Remarks

A VITAL TOPIC

Troy, Ohio, July 19. — I believe that you have chosen one of the most vital subjects that would be worthy of the editorial comments you have so generously given in your August issue of AERONAUTICS magazine.

The establishment of a separate Air Service in the Department of National Defense is vital in more ways than one, so apparent to some of us that it would be idle for me to enumerate to you my impressions of the various military and industrial phases of the subject.

Let me commend you for the courage displayed in going after this formerly taboo subject. I feel that you will not suffer thereby, and I truly hope not.

CLAYTON J. BRUKNER, PRES.
—THE WACO AIRCRAFT COMPANY

ENTERPRISE SHOULD BE PROTECTED

Defiance, Ohio, August 14.—There are lots of people who are willing to invest their money and share in the profits of any proposition which someone has worked hard to get on a paying basis.

We are for the man or company who has the nerve and foresight to go ahead and work these things out to a successful basis.

With the establishment of landing fields all over the country there will be many opportunities to start successful short air lines between smaller cities not on the regular air lines and anyone going ahead and establishing such lines should be protected by the proper legislation.

G. H. ROBERTS—THE SIMPLEX AIRCRAFT CORP.

LINE WILL NOT SUPPORT TWO COMPANIES

Minneapolis, Minn., August 3.—We firmly agree that it is a step in the right direction.

On July 19th of this year we announced and started operating Travel Air Deluxe cabin planes between the Twin Cities and Winnipeg. This schedule was started after a thorough survey of the line between the two distant points and after we had met with the various city officials and civic heads and had been assured of their fullest support and cooperation. The newspapers of the six towns enroute acclaimed our enterprise as fulfilling a long felt need.

The day our line started in operation there were celebrations held in town and we were congratulated for our enterprising spirit in pioneering the field.

Within a day after we started the Northwest Airways announced a line to Winnipeg. . . . We positively know that the line will not support two companies and will only result in mediocre service at best on the part of both companies.

At this time we are still the only company operating in the field and expect, of course, to operate at a loss until we can build the business up, but it presents a rather discouraging outlook knowing the threat that is being held over us by the other company.

In this state the bus transportation companies are restricted to certain areas by the state, in which to confine their operations. There is now no rate cutting, equipment is kept in better shape, schedules are being kept up and each company is thereby enabled to make enough money to continue operations.

We are most heartily in accord with your ideas on the subject.* There is no doubt but that the public in general will be benefited by such regulation, the equipment and the investor's money will be protected, and it would make for more rapid improvement of air transportation.

NORMAN G. WARSINSKE, PRES., FRANK D. BLAIR, SECY., HAROLD S. LEES, TREAS.
—CANADIAN AMERICAN AIRLINES, INC.

** The Canadian-American Airlines infers that we were for the proposed legislation at this time. This is incorrect.*

A MOTOR MANUFACTURER'S VIEW

Glendale, Calif., Aug. 8.—. . . Good, clean and keen competition, as a rule, is the life, and assures the future of all business and industry. In my opinion the aviation industry has all the regulation it can stand at the present time.

W. B. KINNER, PRES.
—KINNER AIRPLANE & MOTOR CORPORATION

SUBJECT SHOULD BE STUDIED

Hartford, Conn., August 5.—I have your letter of August first relative to some form of protective legislation for air line. This matter raises some extremely difficult problems, and I am frank to say that while we have given a great deal of study to the subject it is not yet clear in our minds what is the best procedure.

Of one thing I am certain, and that is passenger transportation by air must be encouraged and developed to its fullest extent. No organization yet has succeeded in placing purely passenger transportation on a profitable or business basis. In spite of this fact, competition in passenger traffic between various points is already becoming quite acute in many instances. It does not seem to me that this is conducive to proper development of this important phase of commercial aeronautics.

Some time ago we took over the Stout Air Lines purely because of our desire to contribute something to the development of passenger transportation. The Stout Air

AERONAUTICS presents here the informal opinions of vital men, believing that in a rapidly changing industry, these are of great value in estimating the direction aviation will take. These are selected primarily for value in thought or opinion.

Lines have no mail or express contracts, and are engaged solely in the business of passenger transportation. During their several years of operation they have met with extremely good success from the standpoint of safety to passengers, maintenance of schedule, etc. and have always employed the best of multi-engined equipment. This company has lost money from the beginning of its operations. We are now experimenting with the operation, attempting to find some way of placing it on a business basis.

All in all, I believe this is a subject which must be studied carefully, and we should not jump to conclusions too quickly. It certainly does not seem proper to permit of unbridled competition. The real difficulty is that some companies operate their lines much differently than others from the standpoint of character of equipment and the general service which is offered. Obviously, these matters greatly influence cost of operation, and in many instances operators who are not giving proper service are offering rates which are impossible for a good operator to meet.

F. B. RENTSCHLER, PRES.
—THE PRATT & WHITNEY AIRCRAFT CO.

REGULATION INADVISABLE

Paterson, N. J., Aug. 8.—It seems to me that this idea is in many ways inadvisable. In the first place it will stifle competition and, I believe, hold back the development of air transportation. The grant of what would be practically a franchise to an air transport company in the manner which you suggest, would immediately be followed by restrictive legislation and control by the Federal Trade Commission. Such regulation will eventually come in a certain degree to the air operators, but the fact that they have no franchise and that they have no rights of way across the country, will always make them more independent than an organization like a railroad.

CHARLES L. LAWRANCE
—WRIGHT AERONAUTICAL CORPORATION

THOSE NEW REGULATIONS

Wichita, Kansas, June 25.—Yes, I have some very decided criticism of the new Department of Commerce regulations in regard to flying schools. . . . Under section 4, paragraph B, in laying down the minimum size field for which a school shall operate off of. In the same section paragraph D it gives the total number of planes engaged in action from a given field if not to exceed ten planes for 100 acres at any one time. Under the same section, paragraph E not more than fifteen students shall be enrolled in flying courses for each airplane available for flying instruction. I don't know, but it looks to me like somebody had a lot of conversation that he didn't know what to do with, or that he must have been raised out on the plains of Texas or Arizona where they had lots of ground, and received their education in Wichita where there are lots of airplanes. At any rate it looks to me like the Department of Commerce was going to put the flying schools out of business except the large corporations that are now in business and have their own landing fields of sufficient acreage to take care of enough business to make it a paying proposition. Personally I hate to see the little fellows taken advantage of and deprived of the means of making money because the government is trying to run their business either because of a political influence caused by money or for the ultra conservatism of the government. In section 5 dealing with paragraph 1 dealing with instructors' rating, paragraph 2 dealing with renewals, and paragraph 3 dealing with the allowed amount of time a man shall work at flying an airplane, is in my mind a very unreasonable fact due to the fact that a majority of the instructors today are flying on an hourly basis and are getting paid by the hour, and if they want to work ten hours a day I see no reason why the government should say they should only work six. All licenses issued for both flying and ground instruction are only issued for a period of one year at which time for any reason, justifiable or unjustifiable, in some cases they could be revoked. In section 6, paragraphs 3 and 4 and under C and under D, paragraph 3 making it necessary that 66⅔% of the students accepted for instruction graduate from the course, I would like to know how we are going to determine upon accepting these students, whether they are going to graduate or not, whether they are going to make pilots or not, whether they are going to make mechanics or not, and what have we.

This just gives you a small idea of how these regulations can be chewed to pieces. However, it is probable that these regulations are going to be like all other laws and regulations that are passed by city, state, and the government, that they will probably never be lived up to. Should they, however, be enforced in the minute details it is my opinion that the flying schools of the country would do well to turn into farms again, whereby they be of more profit to the government and would require a great deal less over-head and personnel and equipment to enforce these laws and regulations.*

** The writer is head of one of the country's largest schools. We thought it the part of friendship to delete his name.*

AGAINST PRINCIPLES OF COMMON LAW

New York City, Aug. 6.—The law which the Congressman would like to have passed creating virtual franchises in aerial communication would be a grand thing if it could be done. However, I believe it to be against all principles of Common Law.

So far as I know nothing in the world would ever be able to stop a man from buying two flying fields, one at one city and one at another, and fly aeroplanes between them. We hope that the principle is established that the air is free just as the water is. This being the case, I believe exclusive franchises would be impossible.

G. M. PYNCHON, JR.—PYNCHON & CO.

IT CAN BE ACCOMPLISHED

Dearborn, Mich., August 6.—I have your letter of July 16th together with a reprint of an editorial which will appear in the August issue of AERONAUTICS wherein you come out strongly in favor of a National Air Academy and separate air ministry.

I am entirely in accord with this idea and believe that such a program, if worked out, will be highly beneficial to the Air Service.

I realize that it will be very difficult for you to bring this about at once, but I fully believe that it can be accomplished.

EDSEL FORD, PRES.—FORD MOTOR COMPANY

AGAINST PROPOSED ACADEMY

Lowell, Mass., July 22. — My snap judgment would be strongly against such an academy.

At the present time it seems to me that West Point and Annapolis are amply qualified to train the small proportion of men who would be pilots or executives in our air forces during a war. The Army and Navy Departments are also qualified to develop planes for Army and Navy use.

My experience of over a year at the front in France leads me to believe that in time of war the graduates of government schools and the designs of Army and Navy Engineering will not be the deciding factor. Brains, personnel and designs will be drawn from commercial and civil life and therefore, we should do everything in our power to foster civilian training schools and flying clubs, rather than waste a large amount of money on building another West Point for aireraft training.

MINTON M. WARREN, PRES.
—MOTH AIRCRAFT CORPORATION

THANKS!

Colby, Wis., July 16.—Your stand, together with your influence in the Aeronautical field should have a large influence on the public, military authorities and others who have already voiced their approval of such an Academy.

Of course there will be opposition but the open minded could not see anything but the best in the establishment of a National Air Academy.

As head of a growing company and with that interest in mind of the best for the good of aviation I can see nothing but effi-

[*Continued on page 90*]

COMMERCIAL AVIATION—A REVIEW OF ACTIVITIES

[*Continued from page 36*]

The Department has charge of the erection of beacons and other markers to aid in the continuous movement of air traffic night and day

means of a cross-coil beacon, sending out alternate signals, and a special receiving set, antenna, and visual indicator on the airplane, it is possible for a pilot to tell by glancing at his instrument board, whether he is on the correct course; or, if he is not on the course, the amount and direction by which he is in error. Two beacons of this type are already in use: One erected by the Bureau for experimental purposes at College Park, Maryland, on the New York-Atlanta airway; another at Bellefonte, Pennsylvania, on the transcontinental airway. Along with the development of a successful radio beacon, investigations are in progress covering visual beacons of various types, such as the neon lamp, and last summer a long series of observations was made upon one of these signals erected on the coast of Maine.

The character of the materials used in the construction of aircraft is of the utmost importance, since great strength and extreme lightness are necessary. For several years the Bureau of Standards has devoted its attention to the characteristics of duralumin, the special light alloy almost universally used in aircraft construction. One of the baffling problems in the use of this material has been its tendency to develop what is known as "corrosive embrittlement." By modifying the heat treatment of the duralumin during manufacture, and by coating it with a thin layer of pure aluminum, scientists of the Aeronautics Research Division have greatly reduced its deterioration in service.

The Bureau of Lighthouses, known as the Airways Division, is responsible for the establishment of air-navigation facilities on civil airways. The 1928 appropriation allotted $3,091,500 for these flying aids, and at present there are approximately 8,000 miles of lighted airways, with light beacon towers ten miles apart between intermediate landing fields. The beacon towers are 50-feet high, of light galvanized structural steel, with a 6-foot square platform upon which is mounted a 24-inch standard beacon, rotating at 6 revolutions per minute. The standard beacon uses a 1,000-watt electric lamp and 24-inch parabolic mirror, with a candlepower of 2,000,000, and the beam is elevated two degrees above the horizon. Where commercial electric power is available sun relays or astronomic clocks automatically control the light. Otherwise a 2-kilowatt engine generator set is installed in a small power house at the base of the tower. A concrete arrow is laid out at the base of the beacon tower, pointing along the direction of the airway. Beacon numbers are painted on the powerhouse roof, or the feather end of the concrete arrow, in black figures on a chrome yellow background.

The airways are maintained under the general supervision of the Lighthouse Service district offices. Each airway is divided into sections, each section being in charge of an airway mechanician who is held responsible for the maintenance and operation of his section. Intermediate field equipment and airway beacons are serviced at least once a month. Weather data collected throughout the United States are transmitted to Weather Bureau offices twice daily, and forecasts of flying conditions are made available, under the direction of the Airways Division. Thirty-two new upper-air meteorological stations have been established by the Department of Agriculture to facilitate this service.

The production of maps of civil air routes is assigned to the chart division of the Coast and Geodetic Survey, as an adjunct to its function of producing marine charts. The maps are on a small scale, since the aviator does not require a high degree of accuracy with respect to a multitude of minute details which would escape his attention during his rapid flight over the country. He does, however, require accuracy in major features. Highways, railroads, and streams must be shown in their proper relation to each other. If a highway is shown on the wrong side of a railroad, it sooner or later will make trouble for an aviator. Again, it is not enough merely to show a power-transmission line following a road. The pilot must know at all times on which side of the road the line is located, as, otherwise, flying low in thick weather in order to follow the road as a guide, he might collide with the line.

After information has been compiled it is necessary to send qualified engineers from the Coast and Geodetic Survey to verify the compilation by actual observation on the route, although this is, in part, accomplished by check flight.

And, when we consider the spread of the growing wings of commerce, it is

[*Continued on page 60*]

THE STANDARD OF AIRCRAFT COMPARISON

SKYWARD

Haven't you been imbued with the spirit of adventure; to see mother earth from the sky; to peer down into the heart of a rustling city with her millions at work and play; or scan the lakes dotted with moving vessels or perhaps look into the depths of a forest where flow the rippling streams; or even into the mountains where peaks reach heavenward with majestic splendor?

Is habit keeping you out of the air? Is your first flight still in the future? Shake off the shackles of ultra-conservatism and take the skyroad to new and thrilling adventures. Let the earth become your stepping stone to the limitless reaches of the sky.

Your first feel of the air will convince—establish complete confidence in the stability and ease of flying an airplane.

The steadily increasing confidence in Travel Air performance with dependability is conclusively proven by the fact that over one thousand Travel Air planes are in daily use for business or pleasure.

Flying demonstrations, without obligations, may be had by appointment with any of the 127 Travel Air distributors, all strategically located.

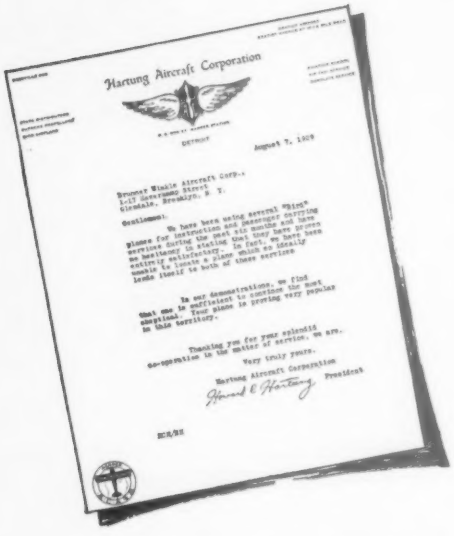
Catalog illustrating and describing three types of dual control cabin monoplanes, seating four and six passengers, and eight types of three-seated open cockpit biplanes gladly sent free on request. Write department B-10

TRAVEL AIR COMPANY

WICHITA, KANSAS

"BIRD"

Why they suit the DEALER!



Hartung Aircraft Corporation

DETROIT August 7, 1929

Brewer Winkle Aircraft Corp.,
1-17 Greenpoint Street
Glendale, Brooklyn, N. Y.

Gentlemen:-

We have been using several Bird planes for instruction and passenger carrying service during the past six months and have no hesitancy in stating that they have proven entirely satisfactory. In fact, we have been unable to locate a plane which so ideally lends itself to both of these services.

In our demonstrations, we find that one is sufficient to convince the most skeptical. Your plane is proving very popular in this territory.

Thanking you for your splendid co-operation in the matter of service, we are,

Very truly yours,

Hartung Aircraft Corporation

Howard E. Hartung, President

HEH/EH

Safety in Training—Speed in Transportation

DEPENDABILITY at all Times

THE MERE SELLING of a plane is NOT ENOUGH. Many times the sale depends upon instruction; often a sale is made to a newly qualified pilot. The dealer's problem is to sell the plane which will afford the quickest instruction and at the same time assure the new pilot of the highest degree of personal safety.

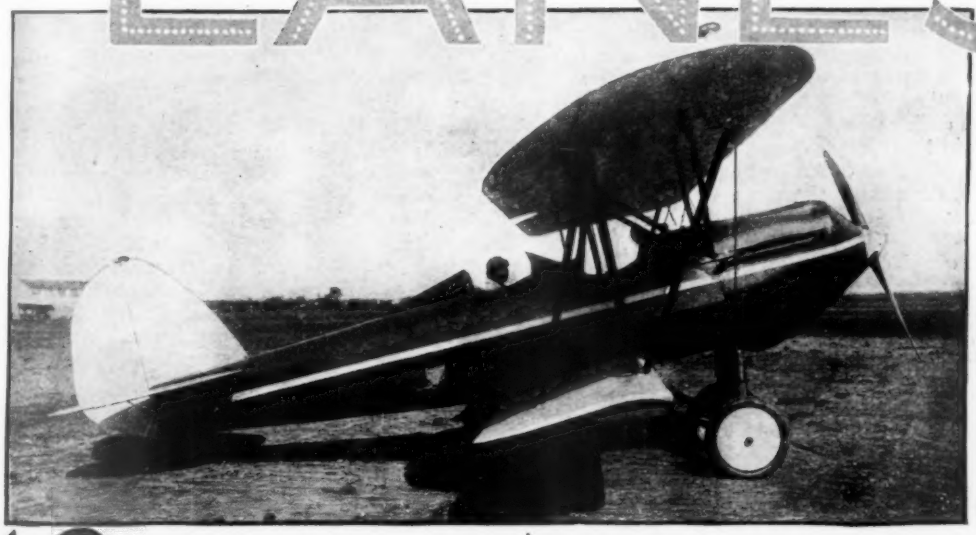
And again, to sell for transportation means the selling of speedy miles, ease of handling, and low cost of operation.

BIRD dealers are satisfied that these planes embrace the features of ALL THAT CAN BE DESIRED IN THE FINEST OF AIRCRAFT.

"MORE PERFORMANCE PER HORSEPOWER"

BIRD

PLANES



Why they suit the FLYER!

1. Chrome molydenum tubing throughout.
2. Inherent stability perfected to a degree which allows fool-proof student training.
3. Dual control with front unit quickly detachable for passager carrying.
4. Perfection in aileron design.
5. Wing design perfected aerodynamically to a degree which permits performance comparable to slotted wings.
6. Landing gear of split axle type with combination oleo and rubber shock absorbers.
7. Metal turtle deck from front to rear allowing internal inspection.

WHEN a BIRD pilot gives her the throttle he knows that he can OUTSPEED any other ship of the same horsepower.

When he hovers over a small field he knows that he can LAND SAFELY—and GET AWAY with EASE.

When he takes a passenger—whether for hire or as a guest—he knows that his passenger is afforded the HIGHEST DEGREE OF SAFETY.

When he lands in a strange field he need not apologize for his plane, because he knows that he has just brought in the GREATEST PERFORMER PER HORSEPOWER.

Confidence and pride are manifested in the satisfaction with which the pilot regards his BIRD.

BRUNNER-WINKLE AIRCRAFT CORPORATION
17 Haverkamp St., Brooklyn, N. Y.

BIRD

COMMERCIAL AVIATION— A REVIEW OF ACTIVITIES

[*Continued from page 56*]

easily seen that a big order was issued the Department of Commerce in 1926 when the Air Commerce Act was approved. The last census, taken in 1927, showed sixty-nine establishments producing aircraft—a total of 1995 airplanes —with a total value of $121,161,853. And these startling figures are expected to more than double when the next census is taken in 1929, for comparing the number of applications on file now and one year ago, the number of pilots and mechanics have tripled and airplanes doubled!

The latest compilation of licenses and identifications shows 1,803 plane licenses and 1,636 identifications, while active licenses for pilots total 2,868; mechanics, 3,102. There are 64 approved airplane models and 5 approved engines. Over 6,000,000 scheduled miles were flown last year, and Secretary McCracken is quite emphatic in his statement that only one-tenth of all flying is scheduled.

Essentially the conquest of the air implies the age-long quest for the conquest of space and time. The obstacles of space have been removed and the most remote regions of the earth are now accessible without great difficulties. The conquest of time is of even greater importance than the conquest of space. For, time is the equivalent of life itself. Every wasted hour in human locomotion that is eliminated is that much added to the lifetime. From a business point of view, the airplane means doubling, if not trebling the output of human energy. In other words, the whole United States is now on a twenty-four-hour basis of business transactions.

And, convincing the public of these facts is part of the business of the Bureau of Aeronautics of the Department of Commerce. When Colonel Lindbergh came home after his epoch-making flight, a representative of the Department accompanied him on a tour of the United States. A similar trip was made by Commander Byrd. The Lindbergh tour embraced every state in the Union, and took 95 days, in which 22,000 miles were covered, with 82 stops. The Byrd tour was of seven weeks duration. Both tours were made with the same objectives; to increase air mail, promote airport construction, and increase public confidence. They demonstrated the possibilities of air-tours for pleasure, and showed the reliability of aircraft over every phase of nature—mountains, forests, lakes, and oceans—in every whim of the elements—fog, rain, and snow.

If we consider that in a little more than two years our present remarkable progress in commercial aviation has been made, it is safe to say that the next five years will see developments in this field which will more than fulfill the hopes of even the most sanguine exponents of air travel. The United States will forge ahead in its air commerce at home. Huge air liners will fly from one end of the continent to the other, day and night, with the safety and assurance of the best equipped railway of today.

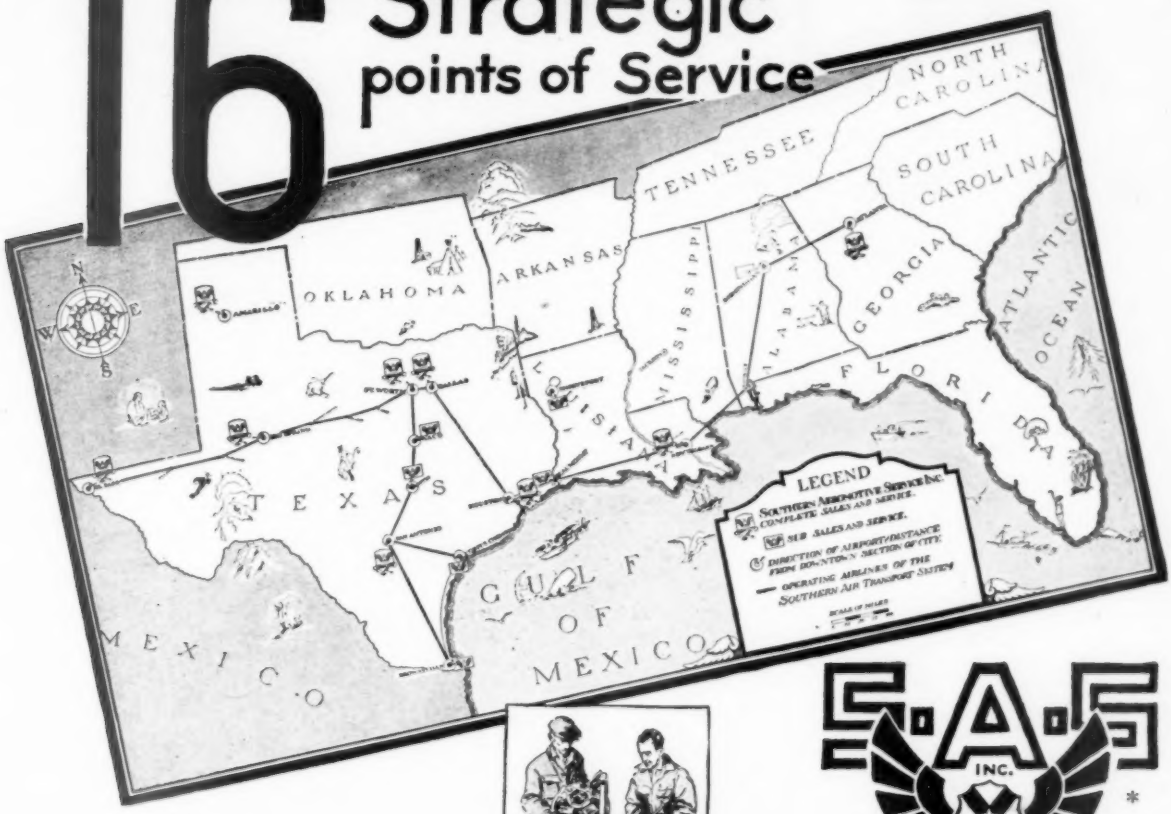
Perhaps the most able summary of the prospects of commercial aviation has been made by L. D. Gardner, President of the Aeronautics Industries and Chairman of the Aeronautic Chamber of Commerce, who says: "The future of civil aeronautics in the United States is limitless. A territory of vast areas without international boundaries engaging in commercial enterprises where speed of intercommunication is a primary consideration and with a huge volume of goods to be transported, the airplane, and the airship perhaps, afford the new transportation vehicles, that fit exactly into the scheme of the ever expanding American industrial life.

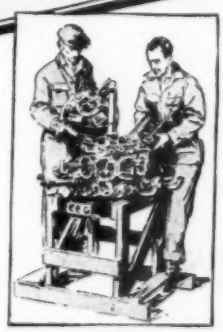
"Planes are being constructed to fulfill every need but those that can carry heavy loads of mail and goods are the most immediate requirements and these are being manufactured in large numbers. The demand for fast passenger service by air in the United States has not yet been as great as in Europe but it is anticipated it will equal European travel within a year. The operation of

[*Continued on page 76*]

Scientific work, as well, is undertaken by the Department so that the Government may keep abreast of all developments

16 Strategic points of Service





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* This emblem on the roof of a hangar shows a branch of Southern Aeromotive Service—the most complete in the South.

Airmen who know the South mark each of the 16 S. A. S. Ports of Service on their Maps

At 16 strategic points, S.A.S. offers complete aircraft and motor service, parts, aero supplies. Also Airport engineering, designing, equipment, construction.

In the South, head your plane for an S.A.S. port, whether it is refueling, patching a wing, checking or rebuilding your motor or just for a pair of goggles. Service awaits you there at the hands of Government licensed mechanics, prompted by an intelligent understanding of your problems.

Southern Aeromotive Service, Inc., is a division of Southern Air Transport System, operating air mail and air passenger lines throughout the South. It is in S.A.S. shops that ships of Southern Air Transport Systems are serviced.

The same service and equipment which maintains the splendid operations record of S.A.T. ships is open to you at any of the 16 strategic ports of S.A.S. service.

No matter where you are, your call to the nearest S.A.S. Station will bring a plane with mechanic, supplies, equipment or parts to you immediately.

WATCH FOR THE S. A. S. CATALOGUE

Southern Aeromotive Service, Inc.

DIVISION OF SOUTHERN AIR TRANSPORT SYSTEM

20 FEET IN THE AIR

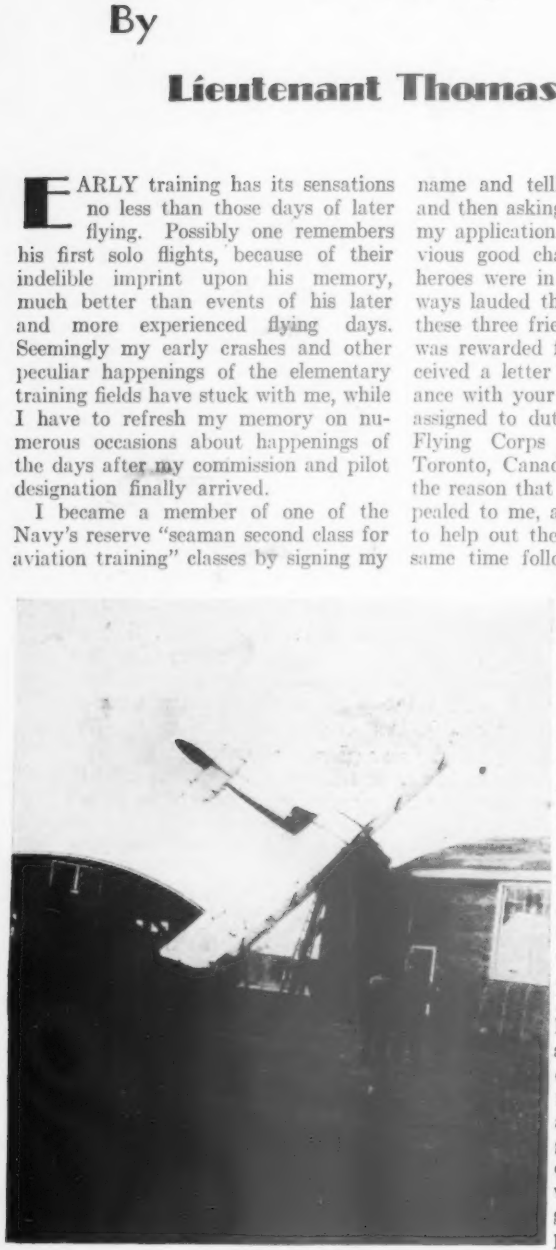
An Amusing Story of Cadet Days

By

Lieutenant Thomas Hutchinson Chapman*

EARLY training has its sensations no less than those days of later flying. Possibly one remembers his first solo flights, because of their indelible imprint upon his memory, much better than events of his later and more experienced flying days. Seemingly my early crashes and other peculiar happenings of the elementary training fields have stuck with me, while I have to refresh my memory on numerous occasions about happenings of the days after my commission and pilot designation finally arrived.

I became a member of one of the Navy's reserve "seaman second class for aviation training" classes by signing my name and telling my personal history and then asking three friends to endorse my application by attesting to my previous good character. Not all of the heroes were in uniform and I have always lauded the unselfish patriotism of these three friends. And their heroism was rewarded for, in a few days, I received a letter stating that "in accordance with your request, you are hereby assigned to duty under training, Royal Flying Corps School of Instruction, Toronto, Canada." I had enlisted for the reason that aviation had always appealed to me, and here was my chance to help out the great cause and at the same time follow my particular bent. And I was advised that "in accordance with my request." I felt somewhat like the young chap who when asked why he didn't join the Army and fight, said that he could see no use in fighting because he wasn't mad at anybody. But, I left for Toronto and without incident arrived and was immediately assigned to duty under instruction, which included nothing which I could see concerned actual flying. However, we spun and looped and gyrated around in utter abandon, while in the classrooms and barracks, and all of us made our greatest flights and had our most serious crashes while safely seated in groups around on the parade ground. Soon we were admitted to the inner sanctum, where only those with "marked pilot material" entered. What we were to be marked with when we came out is another story, but we can skip over that lightly.



My career as a pilot began most inauspiciously under the direction of the Officer in Command, 85 Canadian Training Squadron, Royal Flying Corps. The Canadians adopted the policy of giving a student a minimum of instruction, since they repeatedly told us that a student could learn more in a crash, if he succeeded in getting out of it alive, even though the ship was wrecked, than he could by piling up hours under instruction. Damages to ships were of little concern, if the student profited by it, and my own squadron, nicknamed the "Black Cat" had planes which were referred to as having only three lives left because they had been in six crashes already. It must be said that in the majority of first solos, the students who had a minimum of instruction invariably "got away with it" safely.

Most of us were turned loose at about three hours and a half, but not for long. We usually nosed over or made some such characteristic of the young fledgling landing, and went under instruction again. We were sent off mainly to get the feel of the air, and some of us got not only that, but the feel of the ground as well. So we passed on to the qualified stage and began to mount up our hours so that we could transfer our activities to the advanced training squadrons. Some three such hours had passed when I asked permission one morning to make a short cross country to the

** Lieutenant Chapman is now in charge of the weather reporting and communications systems on the civil airways, Department of Commerce, Bureau of Lighthouses (Airways division).*

THE AVIATOR'S JACKET - - - - - - $5.50

The Original
BUCK SKEIN JACKET
IT'S WARM!

YOUR MONEY BACK IF IT FADES, SHRINKS, OR LOSES ITS FINE TEXTURE

Lieut. Walter J. Prier, a World War pilot, pictured wearing his Buck Skein Jacket.

I've talked to hundreds of aviators about it—and they all agree when you're up in the freezing wind you've got to wear clothes that are WARM. Buck Skein's hefty, suede-like softness imparts a furry warmth that the coldest weather can't discourage. The Buck Skein Jacket is wind-proof—rain-proof and it's WARM!

Whether you're a stunter, a mail or passenger pilot, you've got to have absolute freedom of movement—and Buck Skein gives it to you with its big roominess, its full comfort. When you want a couple of bars of chocolate or a pack of cigarettes handy, Buck Skein's two large, flap pockets are at your service.

When your Buck Skein gets g r e a s y simply *wring* it out in gasoline or wash it in soap and water. It cleans instantly and comes out of the wash soft and mellow like suede. It has double button cuffs and can be buttoned tight around the wrist, thus keeping out the wind. Its knitted belt is 100% pure worsted.

The correct combination to wear with the Buck Skein Jacket is the Buck Skein *SHIRT*—the regulation shirt with two large flap pockets.

MONEY BACK GUARANTEE

If a Buck Skein fades, if it shrinks, if it loses its fine texture, if you aren't completely satisfied, you get your money back.

IMPORTANT

If your dealer can't supply you, send me your check or money order for $5.50 for the Jacket or $3.50 for the Shirt, and I'll personally see that you get your Buck Skein at once.

Buck Skein Joe

Buck Skein Joe, % Lustberg, Nast & Co., Inc., *Makers*, Dept X-10, 331 Broadway, New York City

SEE THAT I GET:	CHECK HERE
A Buck Skein Jacket at $5.50	☐
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Combination of Shirt and Jacket at $9.00	☐

Neckband Size.....

Enclosed check ☐ Money order ☐

Name .....

Address .....

.....

neighboring airdrome about fifteen miles away. In line with the Canadian policy of allowing the student any privilege whatever, so long as it appeared to be helping him to become independent in his piloting, I was granted permission. I started out in one of the good old Dep control Jennies. I was not thoroughly acquainted with the ship or the air and while I reached my destination without incident, I began to wonder as soon as I was safely on the ground, just how I would get back. I suppose the young runaway has the same thoughts after he has made his first sortie.

Some of my buddies of the classroom days were stationed at this airdrome and I soon forgot my worries about the return trip. It was apparent, however, that I must make the start, for it was rapidly approaching the zero hour for tea. The British are insistent that ships be returned at the time indicated on departure, and while I would have preferred this time to remain for tea, I decided that it would be the better part of valor to remain in the good graces of the officers of my home squadron. So amid many good wishes, I took off for the return trip. I had only been in the air a short time when it was evident that the motor was a bit worried about my return and began to whimper in sympathy. And in addition it began to look like rain. But it was merely a case of "Giddap, there, Napoleon" and on we went, fretfully. I tried to stifle the sobs and incoherent sputterings by manipulating the throttle, thinking the gas line might be clogged. I was not to be successful, for the intermittent outbursts from the sick cylinders kept up, but spurred with a desire to stay up as long as the old crate would let me, I plowed on. Now I was hindered by an assemblage of antagonistic winds. I could not climb and I could not land, or at least I failed to see how I could get down in the mass of brush and trees with any degree of dignity or safety. I had previously had similar trouble during one of my flights with an instructor and I had a horror of again being set down in a clump of unfriendly trees. Fortunately there was just enough power to keep me in the air at about three hundred feet. The rough air persisted and I could not help but think of the poor colored man, admiring the airplane at the carnival. The manager approached and implored the colored man to fly the ship because his regular pilot was sick. "You won't be hurt or anything like that, Henry, because I know the man that made this airplane." "Well," said Henry, after scratching his head a moment, "you might know the man what made the airplane, but you don't know the man what made the air." I wished that day that I did know him, for I would most certainly have importuned him to calm the troubled waves. I struggled with my charge with misgivings as to my ability to ever get down anywhere.

The field—my home field—finally came in sight and I heaved a sigh of relief. I would at least be among friends when I hit the dirt. The motor grew gradually worse, having developed a decided cough which seemed to wrack her whole frame. Evidently the motor had decided that it would be much better to lie down and die among friends who could take care of her remains, for she gave up the ghost altogether a short distance from the field.

Here was the dread thing I had heard others talk about. Pilots of experience spoke in awed terms of serious crack-ups in forced landings and we came to fear them. Here I was faced with a forced landing on my own field and if I crashed—well, it might not be so bad, for some of my buddies would surely recognize the remains and I would not be long unidentified—and if I got away with it, I might be able to throw out my chest and brag with the chosen few who had had similar experiences. The chances of this latter coming true seemed very remote. Yet, I still had life and there was certainly hope. With a courage born of desperation and undoubtedly ignorance of just what a Jenny would do, I banked over and turned the nose in the general direction of the field. But where had it gone? It was here a moment ago. Oh, yes, there it is. I had turned quite sharply for a three hour solo student and had become momentarily confused in my directions. The field was just ahead of me, but the familiar sock was stretched at right angles to my course into the field. What should I do? I scarcely had enough room to get into the field straight without trying to stretch my glide to carry me around the group of hangars which lined the near side of the field. Headquarters loomed up ahead and I knew that whatever happened in this particular affair, I would eventually land in that headquarters building, if alive. Consequently I had no desire just now to come in through the roof. I banked her over a bit and a large gold ball just grazed—well, nearly—my head. I had just missed the flagpole. I was all right now except for the fact that I was still headed cross wind and still had to get past the two hangars. I decided to take chances on landing cross wind for I was heading for the space between the two hangars.

It was inspection day — one of those days when the Commanding General and all his aides had decided to visit the camp in order to ascertain the progress of the Americans and report on the high quality of pilot material they found in

[*Continued on page 84*]

For Happy Landings

BY deftness of design and the perfect co-ordination of the soundest principles of aerodynamics the Whittelsey Avian gives a flying performance that no other light plane can approach. Among pilots it is recognized as the outstanding plane for training and sport. The safest to fly, the easiest to land.

In the air its stability is remarkable. And added to the safety inbred in the design of the ship are Handley-Page wing slots which eliminate danger of spins and permit lower landing speed.

No plane is easier to land. And the split-axle undercarriage with its unusually wide track is sturdy, resilient and well-suited to cross-country touring when landings must often be made on rough.

Instruct in a Whittelsey Avian. Its economy of operation will save you money. Its inherent stability and flying qualities will hurry the solo flight.

To Dealers and Distributors

When you fly or sell the Whittelsey Avian you have something to talk about. No other light plane has such a record of performance . . . or the equipment. National distribution of the Whittelsey Avian is being completed in the leading aviation centers of the country. Dealers and distributors are still being appointed. Write for further information concerning our sales plan. We will gladly send you the detailed story of the plane itself. The Whittelsey Manufacturing Company, Dept. F-2, Bridgeport, Conn.

RECORDS IT HOLDS... First solo flight, England to Australia; fastest time, England to Australia; longest flight ever made in a light aeroplane; fastest time, England to India; first non-stop flight, London to Rome.

SPECIFICATIONS . . . *Power Plant:* Cirrus Mark III 95 H. P. air-cooled, four-cylinder in-line aircraft engine. Top overhaul at 200 flying hours. 20 miles to gal. of gas; . . . 500 miles to gal. of oil. . . . *Speed:* Maximum, 102 m. p. h.; . . . cruising, 85 m. p. h.; . . . landing, 35 m. p. h. . . . *Ceiling:* 18000 feet . . . *Cruising Range:* 5 hours or 430 miles . . . *Weight:* Light, 875 lbs.; . . . Aerobatics: 1450 lbs.; . . . Top, 1600 lbs. . . . *Dimensions:* Wings span, 28 ft.; Width folded, 9¼ ft. . . . *Height Overall:* 8¼ ft. . . . *Length Overall:* 24 ft. . . . *Price:* Only $4995, Flyaway or F. O. B., Bridgeport, Conn.

WHITTELSEY AVIAN

WHITTELSEY AVIAN IN AMERICA IN ENGLAND A.V.R.O. AVIAN

THE OUTSTANDING SPORT AND TRAINING PLANE OF THE WORLD

The Two Hour War!

by **Stuart Chase**

In view of the campaign AERONAUTICS *has been waging in the interests of National Aeronautical unity this excerpt from Stuart Chase's book "Men and Machines" is of decided import. From the book "Men and Machines" by special courtesy of Macmillan Company, Publishers.*

ON the 13th of August, 1928, the "Northern Power" opened its attack upon London. Seventy-five airplanes, each carrying five hundred pounds of "bombs," swooped down upon the city from the northeast. They were met by an equal number of defence planes, by batteries of anti-aircraft guns, by an extensive balloon system — by every known device for defence against an air attack. But within less than thirty minutes after crossing the coast line, the defence planes had been eluded, the attack had centered directly over London, "bombs" had been dropped on predetermined targets, the Air Ministry Building, power-houses, water works, indeed all government and strategic buildings were in ruins—and the attacking force was wheeling back into the north without a casualty.

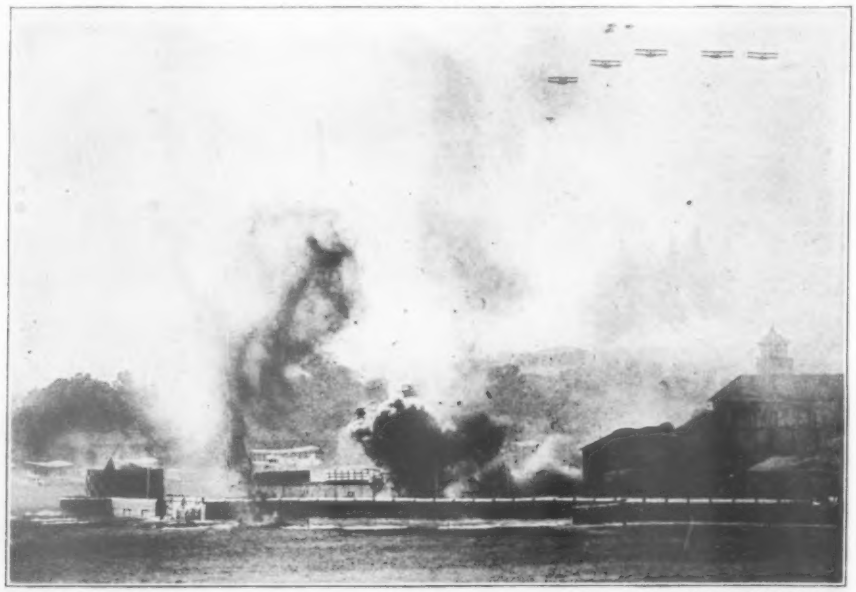
Every specified objective was bombed. Fifty thousand pounds of theoretical explosives were dropped through 16,000 feet, with the accuracy of gun fire. Had these twenty-two tons of bombs been filled with diphenyl chloroarsine, half of the population of London would have been wiped out, 3,750,000 men, women and children, according to the calculations of the judges. Fifty tons of gas would have destroyed every living thing in the London area—an amount readily negotiable by a force of two hundred planes. The attacking planes, furthermore, were manned mostly by civilians in order that the defence might have the maximum advantage.

This whole drama, needless to say, was mimic warfare, but it was carried out with meticulous detail, and the results I have cited were the sober conclusions of the army judges. All known methods of defence were helpless before seventy-five amateur pilots. Not a single attacking plane was downed. Imagine what might be done with five hundred planes manned by experienced army pilots—a force which every one of the leading nations can readily mobilize.

France is now in a position to bring four thousand planes into action at the call of the radio. She is prepared to drop one hundred and twenty tons of bombs in a single raid. This measures progress since the Great War, when the maximum tonnage of bombs dropped in any month was twelve. Yet five of these antediluvian planes broke up the whole Turkish army on its march to Palestine. Germany is experimenting with silent and invisible aircraft—muffled exhausts and camouflaged bodies. The British Ripon plane is capable of a speed of one hundred and fifty miles an hour, can ascend almost vertically, and is fitted with racks for assorted bombs. Recently one of these monsters dropped a torpedo weighing a ton in the Humber. A far smaller bomb carried by a tiny airplane, sent the great battleship Ostfriedland to the bottom in a recent test. Mr. J. M. Kenworthy, M.P., tells us of a 4300 pound bomb, capable of displacing one thousand cubic yards of sand; which, if dropped in Piccadilly, would cancel the whole street. He also predicts shortly a three-hundred-mile-per-hour plane, as well as automatic planes, steered by wireless from the ground, with bombs released by wireless.

There are at least two varieties of poison gas against which no mask is any

[*Continued on page 72*]



Air bombers blowing up a "foreign-defended over-seas port." Part of spectacular Royal Air Force Pageant staged at Hendon, England.

Underwood & Underwood

XUM

Approved Type Certificate No. 174

performance beyond horse power—

The Horse Power of the Barling NB3 gives no indication of its real performance.

Only the performance itself tells the story. The NB3 has broken the World Light Plane Record for a Non-Stop Distance Flight—sweeping 1650 miles from Brownsville, Texas to Winnipeg, Canada in 16 hours—103 miles an hour! It holds the American Altitude Record for Light Planes—20,862 feet!

And, unlike most light planes, the Barling NB3 is endowed with inherent stability. Steadiness and Non-Spin features are engineered into the plane—assuring safety without any doubtful mechanical appliances.

The Barling NB3 is the only plane with a 60 Horse Power engine *licensed* to carry three people—the only all-metal structured 3-place airplane available in the United States—and the cheapest 3-place plane in the world to operate!

Our new Sales Plan is in effect. Factory branches are established—our quick-delivery problem is solved. Direct factory assistance to dealers is an exclusive feature! Write for our profitable Dealer Plan.

NICHOLAS-BEAZLEY AIRPLANE CO., Inc.
Manufacturing Division . . . . Marshall, Missouri

BARLING NB3

Monoplane

BRIEF NOTES OF THE MONTH—[*Continued from page 46*]

pilot may not carry passengers or cargo for hire in any type of plane which he has not flown for at least two hours during the previous ninety days, or in which he has not had at least 30 minutes of practice flying.

The Daniel Guggenheim Fund For The Promotion Of Aeronautics is urging the establishment of a governmental national network of aeronautic weather reporting stations, similar to the system in Germany.

Latest figures indicate that the Aeronautics Branch of the Department of Commerce is licensing new aircraft at the rate of 6,188 per year, pilots at the rate of 4,160 per year, and student pilots at the rate of 20,000 per year.

The Aviation Committee of the San Diego Chamber of Commerce recently adopted a resolution asking the National Aeronautic Association to launch a national campaign for the prevention of the sensationalizing of airplane accidents by newspapers and news reels.

The Department of Commerce is considering the advisability of issuing Approved Type Certificates to parachute manufacturers whose products meet stipulated requirements.

Pelham Manor, N. Y. The Board of Trustees passed an ordinance prohibiting the use of any village acreage for airplane landing fields, factories, or hangars.

Newport, Va., and Grosse Ile, near Detroit, have been designated as international ports of entry from Canada. The Ford Field, at Detroit, was designated as a temporary port.

A committee of the Aeronautical Chamber of Commerce is drawing up uniform legislation applying to time-payment financing of airplanes.

The Ohio Legislature in its recent session appropriated funds for the continuance of the Ohio School of the Air for the next two years.

The Aeronautic Branch of the Department of Commerce received 3,902 specific requests for aeronautical information during the month of July.

GLIDERS

A glider club, sponsored by employees of the General Airplanes Corp. of Buffalo, has been founded with an initial membership of 16 persons. The glider is constructed from a JN-4 fuselage and tail surfaces, and standard J-1 wings.

A home made glider piloted by Mr. Wallace Franklin of Ypsilanti was recently towed from Ypsilanti to Akron, a distance of 170 miles by Hugh Robbins in Waco at the rate of 60 miles per hour.

The Newark, New Jersey, chapter of the American Association of Engineers are organizing a glider club.

PRODUCTION

Mr. George A. Townsend of the General Airplanes Corporation estimates that the export business for aeronautical products would total at least six million dollars by the close of the present year, an approximate increase of 200% over 1928.

Following receipt of order for thirty-five 10-place, 3-motored transports from Schlee and Brock of Detroit, distributors, Bach Aircraft Corporation have speeded up their output to a capacity production of six ships monthly.

There are 101 firms manufacturing airplanes, employing a total of 16,105 workers; 23 additional firms employ 5,977 workers in the manufacture of airplane motors. New York ranks first in the number employed in the aeronautical industry with California second.

The Eastern Aircraft Corp. at Pawtucket, R. I., will manufacture in the United States the all-metal Messerschmitt plane built in Germany by the Bavarian Aircraft Corporation.

P. W. Litchfield, president of Goodyear Tire & Rubber Co., holding new airplane wheel. Its size is 22 x 10-4. Note comparison with older style tire to left. P. E. H. LeRoy, treasurer, is standing beside Litchfield.

The Lambert Aircraft Engine Corporation, a subsidiary of Allied Aviation Industries, Inc., is developing two motors, a five-cylinder air-cooled radial and an eight-cylinder inverted V-type.

Production of the Barling NB-3 Monoplane, manufactured by the Nicholas-Beazley Airplane Co., has progressed to the one-a-day rate and is to be increased to ten planes per week.

The Kellett Aircraft Co. will build a plant at Camden, N. J., for the construction of autogiros under a patent license from the Pitcairn-Cierva Autogiro Co.

Boeing Airplane Company engineers, after experimenting with many types of plating, report that cadmium is the best resistant to corrosion.

The Farman Aircraft Corp. will build an assembly plant for 25 and 50-passenger transport planes at the Central Airport, Camden, N. J.

TRANSPORT

The Air Travel Bureau consolidated ticket office, serving all air passenger lines operating out of Kansas City, was opened two months ago by the Aviation Club of Kansas City. The Aviation Club is a local chapter of the National Aeronautic Association.

The New York, Rio & Buenos Aires Line, Inc., has been organized by a group of bankers to operate a passenger, express and air mail transport service between New York and Buenos Aires. It is expected to cover the 8,000-mile trip in seven days.

The Canadian air-mail service operated between Montreal and Toronto since October 1, 1928, has been extended to Detroit, Michigan, via Hamilton, London and Windsor. By the use of this route mail from Vancouver destined for delivery in Great Britain may be sent four days faster than by ordinary means. The length of the new route is 550 miles.

Boeing Air Transport report that flowers are being shipped regularly out of California by air. Colorado sweet peas are sold in Chicago the next morning, and California orchids are sent to New York in thirty-two hours.

The Saunders Fly-It-Yourself Company of Kansas City have ordered 100 Arrow-Sports which they intend to rent out on a fly-it-yourself basis to qualified flyers at the rate of $15 or $20 per hour.

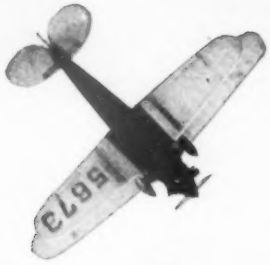
Los Angeles and Guatemala City aerial service was established August 1st by the Pickwick Latin American Airways. Two Fairchild "7Y" Wasp powered planes are used.

An amphibian passenger service once a week has been established between New York and Portland, Maine, for the expected convenience of north woods vacationists.

All records for the amount of air mail and express carried, and the number of miles flown over the lines of National Air Transport, were broken during July when N. A. T. planes carried a total of

[*Continued on page 70*]

XUM



Out of gas . . .

down through fog...into a barnyard

. . . *and out again*

That's the experience of "Stu" Auer flying a Waco "220" Taper-Wing which, he says, "*is the safest airplane built*"

A WACO "220" Taper-Wing takes off from a New York airport. It heads west with 3½ hours of gas. The veteran Stuart Auer at the stick. Robert Herron in the front cockpit.

Over New Jersey the ceiling lowers. They're gradually forced lower down . . . finally just clear the tree tops. They reach the Susquehanna River. They skim along between its high banks north towards Bellefonte.

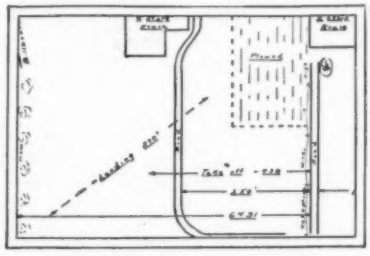
Then fog! Heavy fog! It thickens . . . closes up solidly in front . . . blends with the color of the water. So they turn and head south for Harrisburg.

Out of the fog . . . and into this!

At Duncannon the fog closes in all around them. Unable to stay below it any longer, the alternative is either to risk landing . . . or to climb above it and keep going.

"There is no other ship," Auer says, "that I would have pulled up through fog and continued west, where I had reason to believe the fog was thicker, especially as we had no parachutes."

Pittsburgh smoke coming up through the fog. No chance to sit down anywhere . . . not a hole through the fog to be seen as far as the eye can reach. Nothing to do but fly around . . . hoping for a break . . . until, all too quickly, the gas gives out . . . at 5,000 feet altitude!



Plan of the farm and barnyard

And then . . . set the stabilizer, raise the nose slightly and slip down through the fog. Just sit there and wait. Trust to luck and WACO. Down . . . down . . . no sight of the ground until within 100 feet of it . . . almost too late to do anything.

And what ground! A farm near Bridgeport, Ohio. A small field with houses and wires at both ends . . . trees and hills at either side. And the ship in a mushing condition, one wing slightly low. Yet, even then, it answers the stick. It levels off. It lands . . . and rolls to a dead stop in 270 feet . . . safe in the barnyard! This is typical of WACO! It's a good ship to be in when emergencies come along.

"Stu" Auer says, "I believe that no other ship could land in that short space, or take off again with the load I had. I can recommend the WACO Taper-Wing to anybody who desires the safest airplane built. I know of no aircraft that is constructed as well, that flys so comfortably and that, in a pinch, will carry pilot and passengers through to safety. WACO is my choice."

View of the plowed field . . . and hills!

And WACO will be *your* choice when you consider the performance it gives . . . the way it is designed and built . . . and the fact that more WACOS are in use today than any other make of strictly commercial aircraft. Let us send you full details on WACO airplanes, priced from $3135 to $10,000, flyaway WACO Field.

THE WACO AIRCRAFT CO.
Troy, Ohio

WACO AIRPLANES

"Ask any Pilot"

BRIEF NOTES OF THE MONTH—[*Continued from page 68*]

191,052 pounds of mail and 7,857 pounds of express.

The Aero Coast Express, Inc., of Philadelphia, has been organized to offer a complete flying service. George A. Huhn III will serve as president.

Rand McNally & Company, map makers, have published a new Airways Map of the United States showing established air routes.

A National Air Travelers Association has been established in Chicago as an information bureau for air travelers.

Universal Aviation Corporation has opened a ground floor all-air ticket office and passenger waiting room in St. Louis.

1,641 persons were flown over the Grand Canyon by the Scenic Airways during the period from March 1 to July 15th.

Wedell-Williams has inaugurated a weekly service between St. Louis and New Orleans. The fare is $80 each way, via Memphis.

Refrigerator airplanes carry sea foods between Mexico and California.

MISCELLANEOUS

Konel, a new metal created by Dr. E. F. Lowry and manufactured by the Westinghouse Electric Co., is credited with being much stronger than other metals at high temperatures and can be used extensively in the moving parts of internal combustion engines.

Tests from forest patrol plane over the Spokane, Wash., airport "demonstrated convincingly" that the airplane "smoker" is a fire menace. It was shown that a large proportion of "smokes" dropped from altitudes up to at least 1,000 feet are still burning after they reach the ground.

The Varney Air Lines, Inc., of San Francisco, tendered the lowest bid ever offered on an air-mail route when they offered to carry mail on the proposed route from Pasco, Washington, to Spokane, Portland and Seattle, for nine cents per pound.

A new weather reporting and forecasting service for aviators provides for the collection of weather reports along the New York-San Francisco-Los Angeles transcontinental airway and broadcasting of flying weather reports every three hours day and night.

The Simmons Aircraft Division of Steel Incorporated have issued a very interesting publication called the "Aeronautical Journal of Commerce" designed to carry their own message and that of the American airplane to their established foreign distributors.

Ice-warning indicators are being made by the Moto Meter Gauge & Equipment Corp. to warn pilots of dangerous air strata in sufficient time to prevent formation of ice on wings.

The Shaeffer Oil and Refining Company have announced a prize contest for the best trade name identifying the company's aviation gasoline and lubricating oils. $3,000 in cash prizes will be awarded.

The old Atlantic City Yacht Club property at the Inlet has been converted into a terminal and waiting room for the Atlantic Coast Airways Corporation at a cost of more than $17,000.

Lincoln Aircraft Company, Inc., have received an approved type certificate from the Department of Commerce on their new Lincoln P. T. (Two Place Trainer).

Approximately 10,180 miles of lighted airways are now in operation throughout the United States with an additional 2,065 miles under construction.

W. Irving Glover, second assistant postmaster general in charge of air mail, predicts that the two-cent air mail rate is coming, particularly for transcontinental service.

Anthony G. Fokker estimates that the total production in the United States five years hence should be at least 150,000 planes annually.

The world's largest aerial camera, known as the K-7A, weighs 130 pounds, takes pictures measuring 9 x 18 inches, and carries a roll of film 150 feet long and 9½ inches wide. A Fairchild product.

A giant, 2,000,000,000 candlepower beacon which it is estimated will reach 7,000 miles out in space is to be installed atop the new Palmolive Building in Chicago.

A new type parachute, triangular in shape and steered by a rudder, has been perfected by Maj. E. L. Hoffman of Dayton, Ohio.

The new training plane of the Allied Aviation Industries, Inc., the Monoprep, has recently received its Department of Commerce license.

There are now 575 aviation schools in the United States, and 1,950 business concerns engaged in the aeronautic industry.

All models of Command-Aire planes are now approved and will be licensed direct from the factory.

SCHOOLS

Senor Enrique Toepke, of Guatemala City, Guatemala, a member of the firm of Messrs. Toepke and Co. of that city, is in Marshall, Mo., receiving instruction in flying. Senor Toepke has been appointed by the President of his country as one of three men to study aviation laws in this country and abroad in view of establishing a definite future policy for Guatemala.

The Edgewater Flying Club was recently formed in Chicago. It is a corporation not for profit. The club owns an aeroplane built by its members. H. E. Rennacker, Pres.

The Embry Riddle Flying School of Cincinnati and the Airtech Training School of San Diego, Cal., are now officially rated by the Department of Commerce as transport, limited commercial, and private flying schools.

The Universal Aviation School is the first civilian school to offer its students an advance Navigation course giving the basic principles of all Navigation, including air and sea.

Curtiss Flying Service will maintain an aeronautical university in Chicago. The ground training classes open Sept. 16.

The University of Pittsburgh plans to include courses of aviation and aeronautics in the curriculum of the school of engineering.

The Woodrow Wilson High School of Long Beach, Calif., will include a course in aeronautics during the fall semester.

PERSONALS

Willard Storage Battery Company of Cleveland, Ohio, announces the appointment of Robert S. Van Cleve to the position of "Aeronautical Development Engineer." Van Cleve will take charge of aircraft activities, research and development of the Willard storage battery as it applies to the aircraft industry.

Captain R. J. Goodman-Crouch, former head of the Airworthiness Department of the British Air Ministry, has just arrived in this country to establish his residence at Bridgeport, Conn., where he is associated with the Whittelsey Manufacturing Company as Vice-President and Chief Aeronautical Engineer.

[*Continued on page 82*]

APPROVED BY THE U.S. Dep't of Commerce

WINGED BY EMBRY RIDDLE

FAR AHEAD – *in Making Master Airmen*

It is more than a coincidence that the four great masters of the violin today have received their training from one great teacher . . . Leopold Auer. And all four of them openly attribute their genius to the infinite and painstaking care with which he guided their eager ambitions.

Becoming a master airman is a similar process. Every pupil requires careful and individual attention. The instructor's efforts must be concentrated on one pupil at a time. Human nature, with its individual habits . . . its fears, its eccentricities . . . demands endless patience, tact and a keen ability in materializing latent desires into faultless flying technique.

Embry-Riddle instructors have been carefully chosen from a field that was nation-wide. Actual air-performance was only a part of their requirements. In addition to being Master Airmen, they are MASTERS OF THE SCIENCE OF TEACHING.

Approved by U. S. Department of Commerce

The unquestioned success of Embry-Riddle training methods was certified recently by the U. S. Dept. of Commerce. This is a definite assurance to Embry-Riddle Students that their training conforms to the highest government regulations. These supreme standards, however, were an inherent part of the various courses long before the authorities demanded them.

Embry-Riddle Graduates enter the aviation field equipped for brilliant careers. Transport and commercial flying, maintenance, plane construction . . . in fact, all the requirements of master airmen have been most carefully developed. Embry-Riddle Graduates are recognized nationally because the school itself is unsurpassed.

Regardless of what course you choose . . . primary ground school, advanced ground school, private pilot's, limited commercial or transport . . . you are assured of personal and individual instruction designed to place you in the uncrowded ranks of master airmen, capable of filling the best-paying positions in the most romantic of all the industries in the world today.

A personal note from you will bring more detailed information about the outstanding features of the Embry-Riddle School. Write for it today.

EMBRY-RIDDLE SCHOOL OF AVIATION

Lunken Airport *(Subsidiary of the Aviation Corporation of America).* **Cincinnati, Ohio**

THE TWO HOUR WAR—[*Continued from page 66*]

protection. Cacodyl isocyanide is in the possession of all the great nations, a gas so frightful that, preliminary to hostilities, military men admit to reporters that they do not see how they can bring themselves to use it. There are also irritating gases which cause the sufferer to tear off his mask, and thus take a good full breath of the poison gas which has previously been laid. Government purchasing agents can take their choice of bombs filled with deadly plague bacilli, or with anthrax for the extermination of milk cows and horses. Eight scourges are chemically available for germ bombs: yellow fever, dysentery, diphtheria, malaria, typhus, plague, cholera and typhoid fever. "Cultures can be prepared readily and in great volume; chemical factories can get into uniform in less time than it takes to write"—according to M. Albert Lapoule. Meanwhile the "radium atomite" just discovered, is a more powerful explosive than T. N. T.

. . . . War is declared. Nay, war is only threatened—for he who speaks first, speaks last. In Bremen, or Calais, a thousand men climb into the cockpits of a thousand aircraft, and under each is slung a bomb which the pressure of the finger may release, together with instructions as to where, precisely, and at what altitude, that pressure is to be applied. A starting signal, an hour or two of flight—a little veering, dropping and dodging as the defence planes rise—a casualty or two as the radium atomite of anti-aircraft guns tries vainly to fill a space one hundred miles square and four miles deep—one muffled roar after another as the bombs are dropped per schedule—and so, to all intents and purposes, the civilization founded by William the Conqueror, which gave Bacon, Newton and Watt to the world, comes, in something like half an hour, to a close. Finished and done. London, Liverpool, Manchester, Lancashire, Bristol, Birmingham, Leeds—each has had its appointed place on the code of instructions, and each now duly makes its exit from the list of habitable places on the planet. Not even a roach can survive the entire and thorough lack of habitability. Every power nerve has been cut with explosives; every living thing has ceased to breathe by virtue of diphenyl chloroarsine. Even the author of Man and Superman, who had so often and so successfully defied whatever gods may be, lies prone at last upon a London sidewalk, a ghastly smile on his fine, white face, and a hand flung out upon which a burning beam has fallen . . . .

"No convention, guarantee or disarmament safeguard can be relied upon to stop a powerful nation from using the most effective weapon it has." The most effective weapon, and all powerful nations have it in great numbers, is a machine capable of moving at great speed in a mixture of oxygen and nitrogen. In effect it has reduced all other weapons—battleships, artillery, fortresses, machine guns, tanks—to so much scrap iron. The only thing it cannot be sure of harming is a submarine with a hundred feet of ocean over it. This latter mechanism, if it stays under far enough and long enough, can still do some damage to enemy shipping, but its methods to my mind are over-cautious and over-costly.

A good submarine costs about $5,000,000; it requires a crew of thirty men, its speed does not exceed twenty miles an hour submerged, and it is not a very straight shooter at the best. A good airplane may be had for $5,000, its crew is one, it can travel at two hundred miles an hour, and it can drop a bomb, as we have seen, with remarkable fidelity to its intention. If I were Secretary of War, without too heavy an investment in the capital stocks of steel companies, I should prefer to save my countrymen taxes and my enemy any lack of annoyance, by destroying his shipping from the air, rather than from the depths. As for the submarine's function against enemy battleships, no battleship will dare to leave its harbour; nor should I, for one, care to take up more than the most temporary residence upon it while in its harbour, after the declaration of hostilities. Submarines of great size and cost might conceivably be of some use in shelling coast cities with well chosen varieties of poison gas for the few minutes it would take the air force from those cities to get their bombs suspended above them. Then they must choose whether they will go down temporarily or forever.

In short, it hardly pays to discuss any mechanism of warfare except the airplane. It has the advantage both of being infinitely more deadly than any other weapon, all factors considered, and of being cheap. It can be built in a few weeks, and its cost, relatively speaking, is a trifle. Its outstanding primacy comes, as I see it, from the fact that it can operate in three dimensions, where all other weapons—both present and past—are constrained to one or two. A submarine can operate in three dimensions, but only by slow and cumbersome wallows, nor can it find very much of a belligerent nature to operate upon save sharks. A projectile travels in a straight line with a curve at the end, and so is essentially a one dimensional affair. The new gas bullets are said to be capable of turning corners, which gives them a temperamental two dimensions. A battery, or broadside, can cover a curving plane. Cavalry and infantry can work in two dimensions, and so can a tank, but when a defile or a pass is to be defended, the whole manoeuvre slows down to one.

Against all attacks developed on the rough plane of the earth's surface, defences can be set up. The space through which the offence can move is more or less rigidly circumscribed. Knowing these limits, the defence can act accordingly, and has time to act accordingly. The Merrimac brought forth the Monitor; heavier guns brought forth heavier armour plate. For every offence there is a defence—usually a good one.

But for a three-dimensional offence there is no defence—or only the sorriest kind of a defence, as the attack on London showed. (Some genius has suggested that piano wire be suspended from balloons to trap the air offensive. He should receive a prize from a comic weekly.) The possible points of attack are suddenly cubed. The only way to keep airplanes out of a metropolitan area is to have enough anti-aircraft guns to fill four hundred cubic miles practically solid with steel splinters and T. N. T. This would involve, first, a fantastic number of guns, and second, the grave discomfort, if not the positive slaughter, of the metropolitan population—who could not move on the streets without umbrellas of heavy steel. Defence by home airplanes is almost equally futile. There is too much space through which the attacker can slip. Tag is a good game on the ground, but it loses all charm in the air.

Military strategy, however, has an easy answer to the problem of the three-dimensional attack—an answer which has been the current coin of successful generals for thousands of years, of which, indeed, every chess player is aware. The best defence is an offence. And so the instant the thousand planes leave Hamburg for the cities of England, fifteen hundred planes leave London for the cities of Germany. Their ways may cross, but owing to the slipperiness of space and the haste of each squadron to reach its appointed power-house or Treasury building on schedule the casualties will be few, and the end of two civilizations, rather than one, not long delayed. As such things go, another ten minutes at the outside.

There is one good thing certainly to be said about the next war: it will not keep us long on edge. We shall not have to worry about finding the money for Liberty Bonds, whether George is going to get his commission, Fred has been transferred to the front line, or Alice is really determined to have her war baby; we shall not have to search our hearts to uproot any vestiges of sympathy or sometime affection for alien enemies. The whole business will be over in a couple of hours. With lungs full of diphenyl chloroarsine, we shall not need to worry about anything ever again.

[*Continued on page 110*]

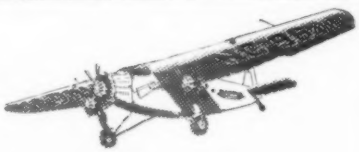
XUM

DIRECTORY

AEROPLANES

FAIRCHILD AIRPLANES

AIR LINES



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SCHOOLS

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Department of Commerce Approved Transport Ground & Flying School

Buyers' Guide

This group of indexed small advertisements will give an up-to-date summary of services and products available. A star (★) in the copy indicates that another advertisement by the same advertiser appears elsewhere. (Please see index on page 114.)

SCHOOLS

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Complete Ground Course
THREE AIRPORTS
All Equipment and Personnel licensed by U. S. Department of Commerce
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it will pay you to visit Newark Air School—one of the finest air schools in the East—before making your choice. Capt. J. O. Donaldson and Maj. R. L. Copsey in charge. Twelve new planes. Elementary and advanced courses. Department of Commerce rating applied for. Write for catalog.
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Complete courses for Pilots. Aeroplane and Engine Mechanic's Courses.
Rated by the Aeronautics Branch, Department of Commerce, as an Approved Transport Ground and Flying School. ★

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DIRECTORY

SCHOOLS (Continued)

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★ Big New Broadfield Catalogue lists all parts and supplies for building better model planes. Send 10c in stamps to

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Hempstead Dept. 110-A L. I., N. Y.

School and Training Information

THOSE who intend to learn the joy of piloting this winter may obtain complete information on schools with complete data on all courses available, prices, etc.

State your requirements to AERONAUTICS *School Department.*

No recommendations will be made, but sufficient reliable information will be supplied to enable you to make a suitable selection.

PUBLICATIONS

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Periodical for Furthering Air Travel in the Service of Business and International Traffic

Air Travel-Engineering, Air Travel-Business Air Travel-Policy

Appears Monthly

Annual Subscription Price Mark 28.00

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AERONAUTICA

MONTHLY INTERNATIONAL ILLUSTRATED REVIEW

Medium of Flying and Aeronautical Construction of Italy

Whatever is of interest in aerial navigation, one may read in this periodical, one of the most valuable and most widely circulated of the aeronautical publications. Subscription: one year 100 lires.

Sample copy 10 lires.

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Wonderfully complete line of parts for OX motors at attractive prices. Also general utility material and accessories. Cylinder repairing. Send for 1929 Catalogue No. 7.

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XUM

Air Speed and Wind Problems

by Lt. Cdr. P. V. H. Weems, U. S. N.
Inventor of Star Altitude Curve System of Avigation.

IN the July AERONAUTICS (page 29) the interesting problem of flying with and against a wind at a constant air speed is discussed. A plane making 100 M.P.H. flying 300 miles against the wind and back to the starting point would require 8, not 6 hours, is the particular thought discussed.*

Such problems as these are of a "practical" nature in that a pilot, unthinking, might essay something like this: "I have 7 hours' supply of gas and the wind is off shore blowing at the rate of 50 miles, therefore, to get the experience of flying over water, I'll fly three hours to sea and back. This will allow me an hour's supply of fuel as a safety factor." The sad result in such an attempt would be that the pilot would run out of fuel 50 miles at sea.

In order to give the inexperienced flyer a mental picture of what takes place, a diagrammatic representation of several cases will be given. The essence of the problem might be summed up as follows: Since less time is required in going a given distance with the wind, than when going the same distance against the wind, the gain going with the wind is less than the loss while going against the wind.

The usual mistake will be in considering *distance* and not the *time*. The wind effect of a given wind speed is in proportion to the time it acts on the plane.

This type of problem is cousin to the one so frequently discussed and cussed aboard ship. At sea the problem is usually put this way: "Does it require more power to drive a ship through the water when going against a current than when going with it?" The wind and sea in this case is neglected. Theory says the power consumed should be the same (or does it?) while the chief engineer says he can tell when he is steaming against a current by the increased amount of fuel required to make the same revolutions of the propeller. The writer would like very much to have the opinions of anyone interested on this and similar problems,—since the same problem exists in the case of a plane flying in a wind.

Perhaps Commander Jeffrey may find time to go more into detail on this type problem in his series of articles he is writing for AERONAUTICS. These are simple cases which become more complicated when the direction of the wind is at an angle to the course.

* The idea was originally discussed in the book, "Airplane Transportation."

CASE I

AIR SPEED 100 MPH., WIND 0.

300 MILES IN 3 HOURS

ROUND TRIP, 6 HRS.

300 MILES IN 3 HOURS

CASE II

AIR SPEED 100 MPH., WIND SPEED 50 MPH.

$$\text{WITH WIND} \frac{300}{150} = 2 \text{ HOURS}$$

ROUND TRIP, 8 HRS.

$$\text{AGAINST WIND} \frac{300}{50} = 6 \text{ HOURS}$$

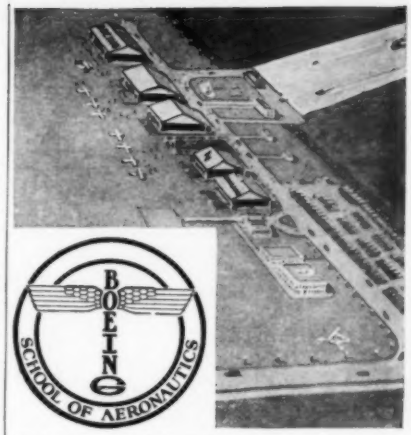
CASE III

AIR SPEED 100 MPH., WIND SPEED 100 MPH.

$$\text{WITH WIND} \frac{300}{200} = 1\tfrac{1}{2} \text{ HOURS}$$

ROUND TRIP IMPOSSIBLE (Plane Stationary)

$$\text{AGAINST WIND} \frac{300}{0} = \infty$$



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AERONAUTIC LAW—[*Continued from page 23*]

writers and sometimes in judicial opinions the phrases 'the law of nature,' 'the principles of natural right' and other expressions of a like signification; but as applied to civilized men nothing more can be meant by those expressions than that there are certain great and fundamental principles of justice which in the constitution of nature lie at the foundation and make part of all civil law, independently of express adoption or enactment, and to give to the expressions any other signification, to claim them as showing an independent code, and one contrariant to those settled principles, which, however modified, make a part of civil law in all Christian nations, would be to make the writers who use the expressions lay down as rules of action, principles which, in their nature, admit of no practical ascertainment or application."

In the absence of written law on the subject, the result of a trial of the "X" case would undoubtedly depend on the view the judge would take.

In the case of Holmes, Judge Baldwin took a strictly legal view—the view of a metaphysical mind. Another judge may take the broad view of a benevolent person—the human attitude of a philosophic thinker.

* * *

THE legitimate owner of the overloaded aeroplane on its perilous trip over the ocean compels the stowaway to sign a contract that any money the stowaway might receive for stories written by him from his experience as a stowaway shall be divided 50-50 between the writer and the aeroplane crew. Is such a contract valid?

A contract to be binding must be freely entered into. If the stowaway was compelled to enter into the contract by reason of hardship inflicted upon him or by fear for his own safety, he cannot be held to it. This is a contract under duress. It is similar to a contract signed under the threat to kill or in the face of a gun muzzle.

* * *

This department of Aeronautic Law is open not only to the laity, but also to lawyers, legislators and city lawmakers as well. Address your questions of Aeronautic Law to Legal Department, Aeronautics, 608 South Dearborn Street, Chicago, Illinois. Replies will be by mail unless a special wire is requested. Some of the questions will be answered in these pages.

COMMERCIAL AVIATION—[*Continued from page 60*]

satisfactory fast night trains between principal American cities makes it somewhat difficult for daytime airplane service to offer much saving of time, but the lighting of the airways now gives us night air transportation.

"Thrilling achievements such as Lindbergh's flight point the way," continues Mr. Gardner. "Byrd, Chamberlin, Maitland, and Hegenberger, and Brock, and others, have added more laurels to the skill of the American pilots. They form a corner stone of the foundation of a vast air commerce; they establish confidence in the minds of the public. The reliable, steady worker will follow in the footsteps of such leaders. With the support of a people awakened to the benefits of air travel, they will progress with determination toward realization of a great vision—to make aircraft take its place with trains and ships as a standard, safe, and inexpensive means of transportation."

Finally, the Aircraft Yearbook for 1929 makes this significant statement:

"While expansion marked every phase of American aviation in 1928, nowhere was it more apparent, more constructive in character and more enduring than in the field of organized air transport. The operation of aircraft on regularly scheduled routes became a recognized public service supported by a substantial portion of the financial structure of the nation, and by active elements in the older forms of transportation. In 1926 air transport was an experiment. In 1927 it began to emerge from the experimental state, largely through the efforts of a few individuals who spent their time and money in a successful effort to prove that flying the mails could be made profitable to both operator and patron. The beginning of 1928 found them with fair prospects for expansion of this service, providing that they could surmount certain difficulties."

How well these difficulties have been surmounted is attested by the fact that not mail service alone, but passenger and express traffic has assumed major proportions during the past year.

THE LONDON SHOW—[*Continued from page 21*]

Beyond the aircraft and motor manufacturers the Air Ministry Exhibit was perhaps one of the most interesting. This very comprehensive exhibit presented a unique collection of scale models of aircraft dating from the first hot air balloons of 1670 to the present day aircraft and showed all of the various stages of evolution. Imperial Airways had in its exhibit a cabin section of one of their Argosy planes so arranged that people could occupy the seats and by looking out of the windows could see a cleverly arranged panorama of slowly moving painted scenes taken on the run between England and India.

The progress of aviation which has been accomplished since the last Aero Show in London is well illustrated by several comparisons. At the time of the 1924 Show the fastest plane was able to develop a speed of 187 m.p.h. while the Supermarine exhibited at Olympia this year is capable of a speed of 318 m.p.h. In 1924 the longest distance non-stop flight was 2,511 miles and this year the Fairey Napier Mystery plane exhibited at the Show has flown a distance of 4,130 miles on a non-stop flight in fifty hours.

Some of the aircraft exhibitors at Olympia maintained planes at the new Heston Air Park, just outside of London and on July 20th a private air meet was held there which attracted an interested crowd. The two new Junkers K-type planes built by the Flygindustri of Linhamn, Sweden, created much interest. A twin motor bomber surprised the spectators by describing a number of well executed loops and performing many evolutions which on account of the large size of the plane created much interest. With the R.A.F. Display at Hendon, the King's Cup Race which began and ended at Heston, the Aero Show at Olympia and the coming Schneider Cup Race interest in flying should be greatly increased in Britain this year.

Will You Buy a Plane This Winter?

AERONAUTICS places at the service of its readers an advisory bureau for those contemplating the purchase of planes or equipment. Data on performance, specifications, price, etc., on any plane or motor you are interested in will be gladly furnished.

If you are undecided as to the type of product that will adapt itself to your needs, a statement of your requirements will bring advisory suggestions and comparative data. All inquiries should be addressed to *AERONAUTICS Buyer's Service.*

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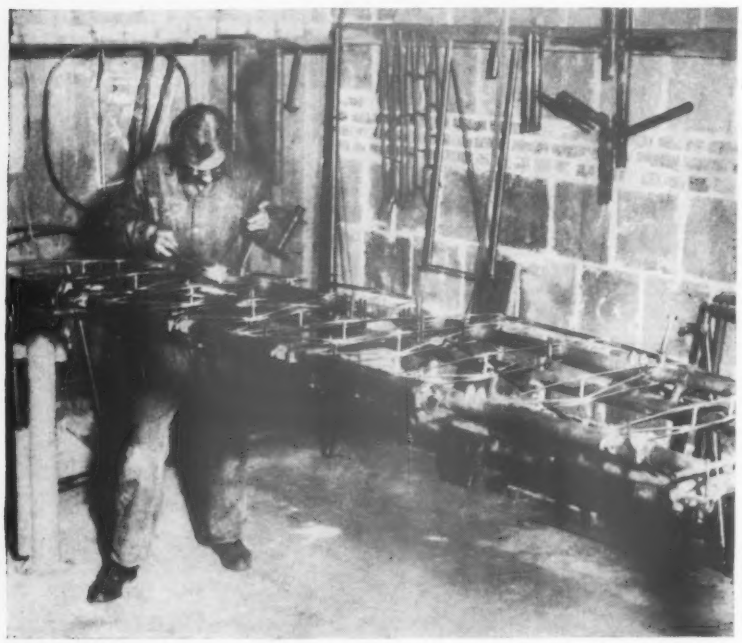
LEARNING TO FLY COMMERCIALLY—[*Continued from page 45*]

can be derived from this type of license. It is of no practical use except to a person owning his plane and this is a matter of considerable expense, far beyond the average Student. The average cost of completing such a course is conservatively estimated as follows.



Thorough shop work is all important

Living expenses while learning (approximately 8 weeks) $15.00 per wk.	$120.00
Ten hours dual instruction @ $30.00 per hour	300.00
Ten hours solo instruction @ $30.00 per hour	300.00
Five hours additional solo time @ $25.00 per hour	125.00
Helmet and goggles	18.00
Flying Suit	6.00
Lecture Courses	20.00
Miscellaneous items, i.e., Books, etc.	$ 25.00
	$914.00

From the foregoing we see that the average cost of training for a Private Pilot's License is $914.00. This, you might say, is an initiatory course in flying and is a "white elephant" insofar as a commercial income is concerned.

The Limited Commercial License, which permits the holder to engage in limited commercial work, requires a minimum of fifteen hours dual and 35 hours solo flying time. Analyzed as follows:

15 hours dual instruction @ $30.00 per hour	$ 450.00
35 hours solo instruction @ $25.00 per hour	875.00
Necessary Flying Equipment	$ 68.75
Living expenses—4 months @ $60.00 per month	240.00
	$1633.75

This type of license permits the holder to engage in such aerial pursuits as dusting crops, flying freight and "hopping" passengers within a specified area designated by the Department of Commerce. It is extremely difficult for one who has completed 50 hours in the air to secure a position due to the many pilots with much more air time who are at present unemployed. The only way to secure these much needed hours is either purchase your own plane, which, in the majority of cases is inadvisable unless the purchaser has unlimited means, or rent a plane at the usual rate of $25.00 per hour. In the event that the latter course is pursued, a tremendous item of expense is incurred.

The goal of all Aviators is the Department of Commerce Transport Pilot's License. Possessing this license, the holder can engage in almost any commercial venture. Two hundred air hours are required before this license is granted and a very thorough practical and theoretical examination is given the applicant. The cost of training for such a license varies from $4,500.00 to $5,500.00 and extends over a period of three years. Do not these figures equal almost those of a College education?

A wonderful help, both to the Industry and student, would be the impressing upon the student by the school to which he applies for flight training, the enormous cost and the uncertainty of commercial positions at the expiration of their courses. No doubt this would deter a great many students from taking flying training, but in the end it would be a great benefit to all concerned.

The aviation enthusiast with a limited amount of capital, imbued with the desire to fly, merits the same advice as given to stock market devotees: "Stay out unless you have the cash."

THE NOTES OF TWO TOUGH HOMBRES—[*Continued from page 26*]

July 11, 5 a. m.

We can make 300 hours I think. Motor a trifle noisy now but not bad. Had some trouble with oil pump last night.

July 11, 1929, 2 p. m.

Thursday three o'clock is O.K. for gas and Fatty's dinner. Send up some more paper; we are out (this paper). HA! you know there is getting to be many people in this world. Guess we'll have to have another war and kill some off. Why a person can't ever have any privacy in the air. Guess you'll have to send me up some window shades. Took a bath while ago; four ships came by and did they peep in the windows! If I had known where to have found a policeman I'd have had them arrested for window peeking. Oh such a life! Motor working all right; everything O.K. except Pete keeps pulling my whiskers. Got them tangled in the controls yesterday and like to have went off in a tail spin. If you see the ship doing funny flip flops and wing turns right after refueling pay no attention—nothing is wrong—just Pete and I reading our wonderful telegrams. See you next week, gang.

Friday, July 12, 1929

Will you bring up 125 gallons of gas, 5 gallons of oil at 1:30? Think we can get by with just the two contacts. Send coffee and newspapers and one bottle of rubbing alcohol. How do things look from down there?

Only one more routine message followed, before the two young pilots descended, happy in the knowledge that they had added something of material importance to the game they loved.

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Please send me free your big Aviation book and full details about your Training and Employment Service.

Name.....
Address.....
City..... State.....
Age..... Occupation.....

AERIAL NAVIGATION—[*Continued from page 30*]

This is a handy sized rule two inches in diameter by six inches in height and is provided with a special scale for dealing with hour angles between 89° and 91° and declinations less than 1°.

A SLIDE rule based on the d'Ocagne Nomogram has been produced (Wimperis and Horsley) which is easier to handle and should prove more accurate than the nomogram itself. Professor Poor has also produced a circular slide rule based on the Haversine formula; but it is reported to be unsuitable for air use.

A combination of both graphic and mechanical methods is Commander Baker's Navigation Machine, which simulates the rotation of the earth by winding a long chart from one roller to another under a transparent sheet representing the celestial sphere. "This machine consists of a framework holding the chart and carrying a transparent diagram mounted on rollers which slides over the surface of the chart (Fig. 8). The direction of the sliding motion is along the parallels of latitude, and the machine is so designed that a certain line on the transparent diagram is always corresponding to a certain parallel of latitude." On the transparent diagram are marked:

1. A time scale (1 deg. of long. to 4 mins.) corresponding with longitude scale of chart.

2. A series of curves of constant altitude, cut orthogonally.

3. A series of constant position angles.

The method of arriving at these curves and scales is shown in Figure 8a.

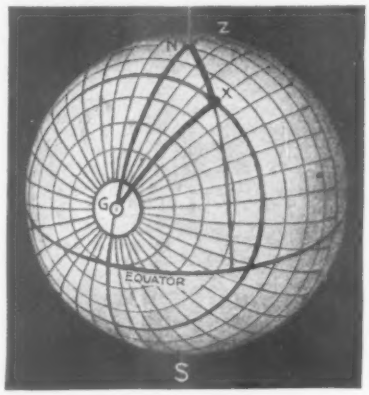

Figure 8A

At any instant the geographical position of the sun has a latitude corresponding to the sun's declination at the moment, and a longitude corresponding to the Greenwich Apparent Time. At any point X on the earth's surface the true zenith distance of the sun at the same instant is the distance G X and all points on the same circle through X will see the sun at the same true zenith distance as at X. Curves of constant altitude for every exact degree upon the earth's surface are therefore concentric small circles with G as centre and 1°, 2°, 3°—90°, one degree being equal to sixty sea miles.

These circles are all cut at right angles by a series of great circles passing through G, the angle at G (i.e. NGX) being *the position line of the ordinary celestial triangle.* As the earth turns around, these two sets of curves move to the westward on the earth's surface and also to the north and south, according to the manner in which the declination changes. N. B.—With a fixed star there would, of course, be no north and south movement.

In Baker's machine these movements are reproduced without any attempt being made to reproduce the daily changes in declination. The sun's declinations, of course, range from 23½° North to 23½° South and this is allowed for by constructing curves for every four degrees of declination from 24° North to 24° South. If the declination is different from any one of these 4° curves—the nearest is used and the altitude corrected accordingly. Thirteen diagrams for use with the sun are supplied and also a set for use with a certain number of selected fixed stars. In order to preserve clarity the star curves are shown for each 2° of altitude and are drawn without the corresponding position angles.

For sustained transoceanic flights in large planes Baker's machine has many points to commend it. So much for "Many Inventions" until we get to Radio Navigation. In my next article I hope to tell the budding navigator what stars to choose, how to find them, and when to use them.

THE DIESEL ENGINE—[*Continued from page 32*]

abnormal position due to disturbed air conditions or other causes, that the engine will continue to function satisfactorily, which is the case with the Diesel engine but is not the case with the carbureting engine.

"The acceleration of the Diesel engine is at all times excellent regardless of the temperature conditions or how long the engine has been idling. This is in marked contrast to the gasoline engines, which must be carefully nursed on a long glide, especially in cold weather to insure the engine accelerating properly in event of power being required previous to making a landing.

"Another interesting point in connection with the operation of the Diesel aircraft engine is that it is not affected by rain or water in quantities which would seriously interfere with the gasoline engine. Primarily, of course, this is because there are no high tension electric currents to be short circuited by water, but the question of a single carburetor air inlet also enters.

"For example, in taking off with a seaplane, it frequently happens that just at the critical instant when the plane is about to get up on its step and every bit of available power is required, considerable water will be shipped directly into the carburetor, necessarily in a disadvantageous position, being low down on the average engine, or the propeller will pick up water with the same result, and the engine will naturally choke and lose revolutions, necessitating a fresh start."

And a little farther on:

"This paper would not be complete without reference being made to another benefit derived from the use of the Diesel aircraft engine, and that relates to the question of radio interference. With the gasoline engine using high tension electric current for ignition, trouble from this source has been very great, especially with reference to the reception of radio telephone messages. It is found that the interruption of the primary current and the creation of each high tension spark result in wave emissions from both primary and secondary conductors as well as spark plug terminals and all other exposed conductors, which impulses are impressed on the receiving apparatus in the plane so powerfully as to compel the adoption of radio shielding means. These means in themselves have a boomerang influence on the ignition system of the engine and while I am perfectly willing to admit that a satisfactory compromise may be found, there is no question that the liability of ignition failure is greatly increased by the radio shielding means, which necessarily includes the provision of metal in close proximity to all live parts of the circuit."

Convinced as we are, then, as to the practicability of the use of the Diesel cycle for aircraft propulsion, let us discuss the probable future trend in construction. Although, as is well known, the two cycle gasoline engine will not operate with as high a mean effective pressure as the four stroke engine, this is by no means true in the case of the compression-ignition oil engine. Since

[*Continued on page 105*]

Every Parks-Trained Transport Pilot *is in a well-paying position today*

Aviation Has Plenty of Money, But Not Nearly Enough Skilled Flyers

So serious is the shortage of Licensed Transport Pilots that every man trained for this work at Parks Air College is working right now and being paid big money for his skill.

This shortage of Transport Pilots is getting more acute. Factories are making planes and the public is buying them faster than pilots can be trained. Students more and more are finding themselves stepping almost automatically into positions paying upwards of $3,600 a year—more than the cost of the complete course—as soon as they receive their Transport Pilot credentials.

Nowhere can you get these credentials any more quickly, or more certainly, than at Parks Air College, the biggest and finest flying school in America, the school that got transport approval from the United States Department of Commerce without a moment's preparation for examinations.

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So widespread is this school's reputation for high standards and absolute thoroughness of training methods that its graduates quickly discover that Parks-trained pilots are preferred.

Leaders in aviation, one of the richest of modern industries, know Parks Air College like a book. They know it to be modern and complete in the most trifling details. They know of its staff of long-experienced pilot-instructors, none of whom has less than 1,000 hours in the air to his credit.

They know that all the school equipment, including the big fleet of open-cockpit and cabin ships, is new and kept up in the best of condition. They know that a man trained at Parks Air College has been TRAINED RIGHT, that he has had the best instruction possible, that he is a man with an assured future in the air.

6,188 New Ships Each Year With Only 4,160 Pilots to Fly Them

The Commerce Department has just announced that new planes are being licensed at the rate of 6,188 a year, new pilots at the rate of 4,160. That means there are only two-thirds as many new pilots as are needed to fly these ships. It means that each year there are 2,028 ships forced to stay on the ground because the highly paid, highly skilled men needed to take them up are lacking. There's opportunity for you!

Get into aviation! It's one of the most fascinating things on earth today. It's chockful of future for men of foresight and, above all else, action. Action is the very backbone of this ever-growing work. Let your first action be the filling in and mailing of the coupon below. Now!

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CRACKUPS AND THE PRESS—[*Continued from page 49*]

explained, with as little technicality as possible, just what happened. Then, there would have been a clear, concise account, which probably would have attracted little or no attention.

But do pilots do that sort of thing? Not so you could notice it. What says Lieutenant Hoy? "According to popular fantasy, I have had a couple of hair-raising experiences. A bad landing in a flying boat damaged a wing somewhat. The landing was related to the daily readers as follows: 'While flying low over the Mississippi, the plane was seen to suddenly develop wing trouble.' There was trouble all right, but I'm ashamed to explain where."

And there's the gist of the whole situation. He was "ashamed to explain where."

He says further, "When the American Public can learn to see through the vagaries and limitations of a reporter's mind, then it will be really air-minded." The answer to that is that when the reporters are able to penetrate the somewhat solidified headpieces worn by a lot of pilots, with the fact that accurate details are essential, not only in record-breaking flights, but in crackups as well, the American Public will begin to get the real story of just what happened.

The average pilot is willing enough to tell all about the records he breaks. Then he craves publicity and plenty of it, for the good of the service, and for his own glorification. Free advertising has been handed out by the column, but it isn't going to be many more years before the industry now in its babyhood, is going to be paying for that space which it now gets for nothing.

Therefore, it behooves every mother's son in the game to get on, and keep on the right side of the newspapermen as long as possible, in order to do for aviation the best possible thing—secure for it favorable publicity. Don't try to cover up when there is a crash. Rest assured that the reporter will find out somehow, and the chances are that the story he gets won't reflect to anybody's credit. Give him a break. He has the job to do, just as you do, and he is just as much responsible to his city editor as you are to the manager of your field.

A job is a job, the world over, and while none of us likes the task of digging up a story of an airplane crash, yet if we are assigned to it, rest assured Lieutenant Hoy and all you other pilots, we are going to get it. And all your attempts to cover up just create that much more hard feeling, which at a time when you are looking for something, is going to work against you.

Newspapermen as a whole, are a pretty good crew. Of course, there are some who go haywire for no good reason at all, just as there are pilots who are no credit to the business. But on the whole, the crew will treat you like a white man, if you reciprocate. Try to step on a reporter and you are apt to find yourself badly bitten by the time the smoke clears.

And if you do give the reporter a break there is less likelihood of finding yourself in headlines some fine morning. Of course, you who are big men in the game, even if you are in small puddles, are news, regardless. You are in the public eye, and being there, you cannot escape publicity, favorable or otherwise. Hence if you make it a point to treat the reporter fairly, he is bound to do the same for you.

It makes it easier all around. He knows he has the job to do, and you, if you will stop and think, will realize the same thing. True, it is a tough job but why not pitch in like a good fellow, and give the newspaperman the information he is seeking, without turning him off with a short answer.

I have in mind right now the story of a cameraman's run-in with the manager of a field some time ago. A ship was washed out, and the cameraman was sent out to get some pictures. He didn't like the assignment, but it was his job. He went. When he got there, he found the ship had been dragged into the hangar (what there was left of it) and the manager refused to let him take some pictures. Then to cap the climax, he and a mechanic proceeded to rip the canvas from the remains of the plane and throw it in a heap in one corner. On top of this they piled what was left of the ship. "There," said the manager, "now there is no picture!" "Isn't there!" shot back the photographer, "you bet your life there is," and he promptly proceeded to take a picture of the pile of rubbish. It ran in the paper, and created a far worse impression on the readers than a straight crash picture possibly could have.

Now those two are bitter enemies, and every chance that photographer gets he takes crash pictures from the worst possible angle—and you know what that means. Had the manager been a good sport and allowed the pictures to be taken in the first place, he and the photographer would now be good friends, and the chances are that crash pictures, instead of showing the worst of the damage, would now be taken from the good side.

So it is with the newsmen. Given all the dope as rapidly as possible, they appreciate the service, and nine times out of ten instead of writing a bull story, present the facts as they are, thereby many times spoiling what is considered a good story. Take the case of a man who is writing airport news on an opposition sheet to mine. His job, right now, is in jeopardy because he tried to give an unlicensed student pilot a break in a recent "fool" crack-up.

That's the kind of treatment you'll get if you play with the boys, instead of against them.

BRIEF NOTES OF THE MONTH—[*Continued from page 70*]

Lawrence V. Kerber, formerly Chief of the Engineering Section, Air Regulations Divisions, Aeronautics Branch, United States Department of Commerce, has been appointed President of the Spartan Aircraft Company.

H. C. Sine, recently of the inspection section, aeronautics branch, Department of Commerce, has been appointed chief inspector of the Spartan Aircraft Company.

Jack Morgan of Dallas, Tex., has been selected to supervise the Dallas factory branch of the American Eagle Aircraft Corporation located at Love Field.

Henry Bushmeyer, professional parachute jumper, recently leaped from 10,000 feet with a special radio transmitter strapped to his chest through which he described his sensations.

W. T. Whalen, formerly Vice President and General Manager of the General Motors Export Company, has been appointed Vice President and General Manager of the Fokker Aircraft Corp. of America.

Dr. Max M. Munk, authority on aerodynamics and former N. A. C. A. expert, has been retained by the Alexander Industries, Inc.

L. W. Ashton, formerly with Baldwin Locomotive Works, Chester, Pa., has been appointed sales office manager of the Bellanca Aircraft Corporation.

Pilot B. C. Moore has been added to the Alliance Aircraft Corporation's staff of pilots. He will be in charge of the company's flying school.

Directors of the Wallace Aircraft Co., Inc., a division of the American Eagle Aircraft Corporation, have elected E. E. Porterfield, Jr., president of the American Eagle Company, to head the Wallace organization. Lloyd Lancaster has been appointed production manager.

Kenneth M. Lane, designer of the airplane which last May broke the world's altitude record, has been appointed Chief of the Aeronautical Engineering Section of the Department of Commerce.

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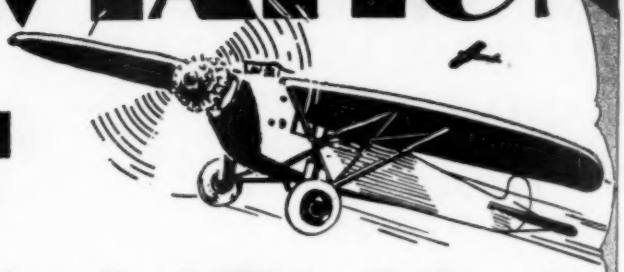

The High Standard of This School Brings Students from Other Continents

SOUTH AFRICA—Alaska—Scotland—Canada. Already we have enrolled students from these foreign countries, so far-reaching is the fame of the Lincoln Airplane School—*where Lindbergh learned.* Louis B. Scholtz traveled 16,000 miles from South Africa to take advantage of Lincoln training. Herbert J. Brown and Cyrill Clayton came to this school from far-off Alaska. And Robert Wright of Hawick, Scotland, has recently enrolled.

Student Just Landed After His First Solo

Constantly we are enrolling new students!—from California—from Maine—from New Mexico—from Missouri—from nearly every state in the Union, and Canada. They come to Lincoln—passing up other schools—some traveling thousands of miles to get thorough, practical training at the school where "Lindy" learned.

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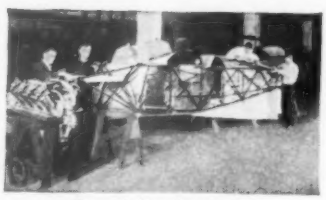
In keeping with the Lincoln high standard of training are Lincoln facilities. We have more than $350,000.00 worth of buildings and equipment, including modern flying fields and plenty of dual control training planes. All Lincoln planes, pilots and ground instructors carry the Dept. of Commerce license.



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Our ground course also includes navigation, meteorology, aerodynamics, airplane instruments, fuselage building and repairing, wing building and repairing, landing gear attaching and repairing, doping, painting, assembly and alignment, rigging, inspection, propellers, controls and their functions, ignition, lubrication, trouble-shooting, welding and soldering. We also instruct in aerial radio.

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Commander R. E. Byrd and his flying crew are now wearing Aerotogs at the South Pole.

C. W. (Speed) Holman has made aviation history. On long distance flights and consecutive looping tests he wears Aerotogs.

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See advertisement on page 77.

TWENTY FEET IN THE AIR

[*Continued from page 64*]

our ranks. Here was my chance to raise the quality, and I would be the hero of the camp. That seemed to be my main concern now. So I struggled to get the old ship down and me out of it without any scratches. The flag pole had been left in the rear—there was no longer any risk of carrying the British flag down with me—I would now be able to walk in the front door of headquarters, for I was sure of at least getting on the field in some fashion. The next second I would be through the space between the hangars and wide open spaces would be before me.

That next second never came, for in some manner the fickle god of luck which had previously been riding beside me to answer my every command, deserted me for some other admirer, and I suddenly stopped in both my thoughts and my forward progress. I was stuck hard and fast and elevated some twenty feet above the ground. I was still in the air, but my motor, ship and pilot were not flying. Nor were we doing any hangar flying either. I was up in the air in more ways than one. The hangar roof was a bit below me and too far to reach without crawling over the nose of the ship—and the ground was a sheer twenty feet below me—straight down. My knee, which had been sprained in an earlier crash was not sufficiently strong enough to risk a jump. Anyhow, I was safe up here and here I would remain until someone came up for me. Sometime later, with the assistance of several of my buddies who advised me to forsake flying and join the wrecking crew, I realized that I had passed the first two obstructions in fine shape, but the third like the defenses of Leonidas at Thermopylae refused to let me pass. My left wing had hooked in the hangar door support and held fast. This threw the nose around into the top of the support and had stuck there much in the manner of a pen in a holder. It may not have been a clever landing for the British officers to write home about but one of them admitted to me afterwards that it was the "most extraordinary" thing he had ever seen.

I was in a rather uncomfortable predicament—but I almost decided to stay where I was until darkness would overtake me and I could slip down and hide away—for below me looking up in all seriousness—and with his familiar monocle set jauntily in his left eye—was the Adjutant of all the Royal Flying Corps squadrons in Canada. I had just wiped out one of his favorite ships or at least the salvage crew would finish the job when they tried to take it down from its perch. Finally a ladder was put up for me and I started my descent so rudely interrupted by the hangar some few minutes earlier. A few cheered, but saner heads prevailed and silence filled the air, to be suddenly rent asunder as though a cannon had boomed below me, "I say there you, couldn't you see the 'angar?" The voice of the Adjutant was stentorious enough, but I almost dashed up the ladder again when I noticed the pained and unwelcome look on his face. I had seen the hangar, yes—I had seen several of them and I thought I had seen the one my ship was now resting against for the last time just before I would land safely on the airdrome.

I was almost constrained to reply to this leading question, but refrained because of the rank of my interrogator. Then again, there was the friendship of the British nation at stake. This time silence was golden, for without a word I strode to my quarters, after a dignified descent of the remaining rungs of the ladder, with the air of one who had suddenly, by his remarkable diplomacy, saved his country from a very embarrassing situation.

ARMY FLIGHT TRAINING

[*Continued from page 48*]

through a course of intensive training at an Instructors' School in order to learn the system thoroughly before taking students under their wing.

At the two Primary Flying Schools the eight months' course is devoted to primary and basic training, at the conclusion of which the students are able to fly both the training and the observation type of military planes. They are then assigned to the Advanced Flying School at Kelly Field, where they learn to operate all types of military airplanes and are given specialized training in either Pursuit, Attack, Bombardment or Observation preparatory to active duty in tactical organizations upon graduation.

When the new Training Center at Randolph Field, near San Antonio, Texas, is completed, the two Primary Schools will be consolidated at this site, and with the much more ample accommodations it will be possible to train considerably larger classes of ambitious young men who evince faith in Army flying training methods.

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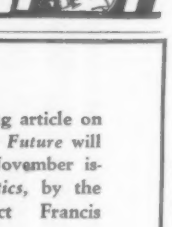
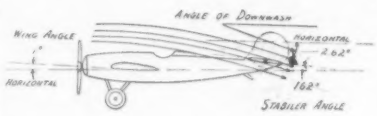


An illuminating article on *Airports Of The Future* will appear in the November issue of *Aeronautics*, by the famous architect Francis Keally.

AERODYNAMICS — [*Continued from page 40*]

square feet, and if the arm of the tail surfaces (that is, the distance from the rudder post to the center of gravity) is three times the chord, that is, 30 feet (see Fig. 11).

So many factors are involved in longitudinal stability, characteristics of the main wing, downwash, shape of the fuse-



Stabilizer setting (Fig. 12)

lage, characteristics of the tail surfaces, etc., that the calculations of longitudinal stability are extremely uncertain, and a wind tunnel test or a test in full flight is the only criterion. The following calculation is only approximately correct, but illustrates the ideas involved:

Trim at a Given Angle of Incidence

Suppose that we want the plane to trim at 1 degree angle of incidence for the main wing (which should be about right for cruising). At what angle should the stabilizer be set?

At 1 degree incidence Ky=.00125. Since area is 600 square feet, and loading is ten pounds per square foot,

$$V=\sqrt{\frac{W}{KyA}}=\sqrt{\frac{6000}{.00125\times600}}=89 \text{ mph.}$$

At 1 degree incidence the center of pressure is at 42.5% of the chord. The moment of the lift about the center of gravity is a negative or diving one, and is equal to 6000×[4.25—3.50]=4500 foot pounds.

The horizontal tail surface has an arm of 30 feet, therefore the downward force on it must be $\frac{4500}{30}$=150 pounds.

What Ky should the tail surfaces be working to give 150 pounds lift?

150=Ky (area of tail surfaces) $.V^2$
=Ky (90)×89^2

Therefore the required Ky=.00021.

Because of certain vortices at the tip of the main wing, the air is deflected downwards and has angle of downwash. (We shall go fully into this in a later article.)

Lieutenant Charles N. Monteith, in his excellent book on Aerodynamics, estimates that the angle of downwash in degrees

=1980 Ky of main wing+0.25
=1980×.00125+0.25
=2.62 degrees

The air strikes the tail surfaces at 2.62 degrees above the horizontal, therefore, as shown in Fig. 12.

The characteristics of a typical tail surface are shown in Fig. 13. To have the required Ky of .00021 the tail surfaces must be set at 1 degree to the effective wind, or at (2.62—1)=1.62 degrees to the horizontal. The main wing is at 1 degree to the horizontal. Therefore, the tail surface should be at +.62 degrees to the wind.

This apparently contradicts our previous statement that for stability at low angles of incidence the stabilizer should be at a negative angle to the wing chord. It is aerodynamically at a negative angle, however, but the "downwash" changes the aerodynamic conditions.

Having obtained trim and setting of the stabilizer, we are now in a position to study the pitching moment curve in detail in our next article. Readers are particularly requested to keep the present article for reference.

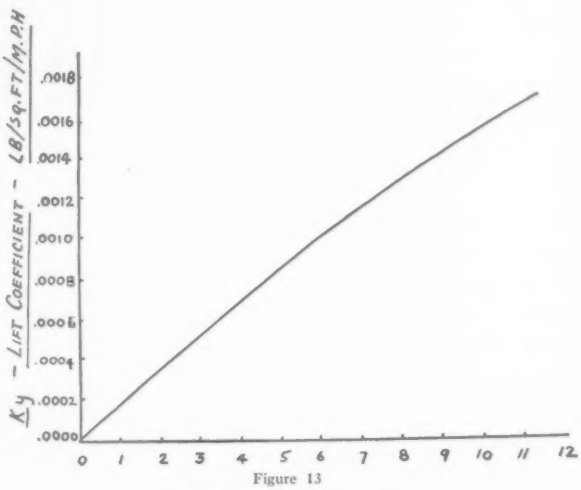


Figure 13

Angle of attack in degrees
Characteristics of a typical tail surface

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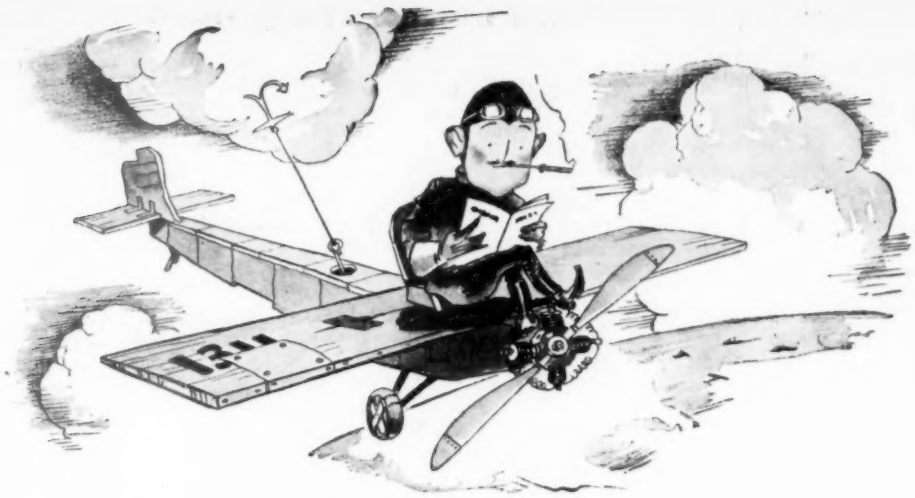

OUR flying friend, Willy McGurk,
Had a plane that developed a quirk,
So he threw out a Sky-hook,
And read in his Fly-book—
To see how to make a plane work!

NOBLE notion, that!—But not everyone has the foresight our William had when he took along the trusty old sky-hook for emergencies.

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"Congratulations on your course! After taking it I can see how nearly impossible it would be for anyone to get into Aviation without the knowledge given in a course of this kind. As instructor you have stuck to the contract, and have been ready to give extra explanation besides. All through, I have felt that I had real backing." Alvin Collins, New Germantown, Pa.

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"Thank you for your letter to the Glenn L. Martin Company. From the communication I received from them, it is evident that your school commands the recognition of the Aircraft Industry as a certified Aeronautical School." G. J. Chaillet, 635 Maryland Ave., N.E., Washington, D. C.

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"I went out to the Alliance Aircraft Corporation to see if I could get into the plant, but when I got there the doors were locked and there was a sign up that said "No Help Wanted." Anyhow, I roused the Employment Manager, who came out and told me not to waste my breath, so I showed him your letter. The result was that I went to work that afternoon, making fittings for the planes. But if it were not for your splendid course and that valuable letter of recommendation, I would still be on the outside looking in." Earl D. Vaughn, Box 222, Hartsville, Ohio.

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B. C. FORBES ON THE STOCK MARKET

[*Continued from page 41*]

and part of August but have nevertheless built a satisfactory background for special activity in certain groups.

To some extent, of course, strength in the aviation shares is due to such favorable basis of the general market. Still, the group has given a comparatively stronger individual performance than displayed by the general averages, due perhaps in large measure to continued active interest of the public in accumulation of sound aviation securities. Such interest is in line with the previously noted trend toward greater business and increasing profits for aviation companies and so long as the industry continues to progress there seems no reason why the aviation group should not hold further possibilities of market advance.

We have previously spoken of the attractions in such issues as Curtiss, Wright, Fokker, United Aircraft, Bendix, Transcontinental Air Transport and Western Air Express. Most of these issues have been acting satisfactorily and continue in good technical position.

Another newcomer on the New York Stock Exchange is the common issue of Aviation Corporation of Delaware. This company is comparatively new, having been organized only last March. Its sponsorship is splendid, however, and its active and aggressive record thus far in its short history gives promise of a continued strengthening of the company's position in the aviation field. It was organized primarily as a holding and developing company but acquisition of subsidiaries has been so rapid and so successful that its interests now cover practically every angle of the aviation industry. Some of its acquisitions, involving apparent control of stock ownership, have been Colonial Airways systems, including the Western and Canadian companies, Universal Aviation, Fairchild Aviation, Southern Air Transport, Embry-Riddle Company and Kreider-Reisner Corporation. In addition to control of these concerns the company has acquired an interest in such companies as Bendix, Western Air Express, Aviation Corporation of the Americas and Waco.

Subsidiaries cover well over 5,000 miles of air routes, making the company the largest air transport system in the United States, own both Roosevelt and Curtiss Fields at New York as well as a chain of other large ports, and show over 100 planes actually produced in the first five months of the year. The company also owns exclusive rights for manufacture in the United States of the German Rohrbach flying boats and the British Armstrong Siddelgy motors.

With such a background, it is not surprising that the company has progressed rapidly in achieving a profitable basis of operation. For a little over three months ended June 30, 1929, the corporation reported combined profits of nearly $800,000. There is no direct funded debt and sole capitalization consists of a little over 3,000,000 shares of no-par common stock. There are also organization options for purchase of about 1,250,000 shares of this stock at $20 per share, exercisable from January 1st, 1930, to Dec. 31, 1936.

Based on the stock now outstanding, earnings for the June quarter amounted to about 25 cents per share. With continued expansion since then in earnings and new properties acquired, annual profits of around $1.50 per common share seem conservative. Financial position is good and theoretical book value for the stock was just under $18 per share, based on the balance sheet as of June 30, 1929. No dividends are being paid but these may be expected if business continues to improve. At around recent prices of 20 the stock appears to offer a favorable medium for long-pull participation in the future of the aviation field.

Prospects for the general stock market have not been improved from a long range standpoint by the advances in official bank rates and continued firmness of credit. Intermediate reactions, perhaps of a rather drastic nature, must be expected but these movements have not yet indicated that the major upward trend in stock prices has been definitely reversed. Prices are high enough to warrant conservatism in buying but a constructive position with a portion of one's stock market capital appears still to be justified.

CONGRESS and AIRCRAFT—

[*Continued from page 18*]

America to be entirely at the mercy of any group of men or group of companies, or at the mercy of Dayton or Philadelphia. The art is too young for that. Unless private industry develops proper and efficient flying schools at not unreasonable rates of tuition, the government should do more to train and develop pilots for commercial purposes. To date the Department of Commerce has done very good work. It has a tendency to become bureaucratic and this fault should be corrected before it becomes chronic.

Now is the time for all interested in aviation to come forward and express their opinion. Congress is in a receptive mood. I am hopeful for the future of aviation in this country. As to General Mitchell, to reverse Moran and Mack, I would say, "Even if he were not so good, I would still be with him."

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THEY TELL US—[*Continued from page 55*]

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RENDERING A NATIONAL SERVICE

Fort Worth, Texas, July 23.—Your magazine in its campaign for the establishment of a national air academy is doing a great service for the nation. The aviation industry will gain by it, but that advantage will be only incidental to the augmentation of our national position in aviation by the establishment and maintenance by the Government of the United States of a separate and distinct aviation department.

A. P. BARRETT, PRES.
—SOUTHERN AIR TRANSPORT, INC.

LEGISLATION ESSENTIAL

Montgomery, Ala., Aug. 10.—We feel that for the time being the law providing for the protection of a transportation company's line is an essential one for the aviation industry, as today where passenger transportation is in its infancy and the time is not present for competition between two lines over one route.

When the time does come the decision should be relegated to the State Public Service Commission.

We suggest that the Federal Law be worded to the effect that when one responsible company has established a line from City A to City B that so long as such company maintains adequate service a second company should not be permitted to compete with company No. 1 unless such second company shall receive permission from the State Public Service Commission and the cities and airports through which the routes shall pass.

L. G. MASON, PRES.
—MONTGOMERY SCHOOL OF AERONAUTICS

ON CONGRESSMAN CABLE'S PROPOSAL

Baltimore, Md., August 7.—It is the writer's personal opinion that the proposed law . . . . will be of ultimate value to the industry providing the rates are regulated by a committee similar to the Inter-State Commerce Commission in the same manner that the rates are regulated on other common carriers, except that the control of these rates should be in the hands of a commission in sympathy with the development of transportation by aireraft. In other words, it is my opinion that regulation of the rates should not be undertaken by the Inter-State Commerce Commission, who are already overburdened with many other problems, but that the regulations of air transportation rates should be rather controlled by an independent committee of men known to be familiar with the development of air transportation.

C. A. VAN DUSEN, IST VICE PRES.
—THE GLENN L. MARTIN COMPANY

"THAT JUSTICE MAY BE DONE"

New York, July 19th.—Since you devoted considerable space recently to an attack by Gen. William Mitchell on the Coolidge aviation policies from 1923 to 1929, will you be good enough to publish a few facts contrary to the tone of the general's animadversions?

It is my opinion that Mr. Coolidge might have done more for aviation like anything else had he been a different kind of leader. He was in no sense a Rooseveltian crusader, yet he made a very satisfactory President, and aviation advanced in gratifying fashion under his administration. Had he been opposed to its development, he would hardly have approved the development of the Air Mail service by Postmaster General Harry S. New, nor would he have waited three hours in the rain at Bolling Field, under scanty covering, for the arrival of the Army World Flyers in September, 1924.

But Mr. Coolidge performed a service for aviation which was comparable to a shot heard around the world, the like of which it had had from no President before, nor has it had since. Shortly after Gen. Mason M. Patrick, chief of the Army Air Corps, had put some bugs into his ear, so to speak, during that long wait at Bolling Field (while Bill Mitchell was in the jungle shooting tigers), he made an unexpected statement at his press conference at the White House, to the effect that the place of the battleship in national defense had been taken by the airplane.

This statement was widely quoted and it fell like a Big Bertha shell into the midst of the Navy clique of battleship admirals who wanted to continue commanding 1,000 men per battleship or cruiser and giving dances which could not be held in airplanes. The force of the statement was so great that it sent the admirals helter-skelter beneath decks. Jones, Strauss, Shoemaker and others repaired to the Bureau of Aeronautics to hold their pow-wow, undoubtedly to ascertain if Rear Admiral Moffett had inspired the obnoxious utterance. In open defiance of their commander-in-chief, they issued a manifesto signed also by Admiral Moffett in which they clung to the battleship in preference to aireraft. This revolt of the admirals called for disciplinary action, but it was peace time, and the matter was passed over. Afterward, the Coolidge position was greatly strengthened by an executive order issued by Secretary of the Navy Wilbur requiring all cadets at the United States Naval Academy at Annapolis to learn to fly.

Although General Mitchell has done much to impress upon the people the need of a separate air service, he has never been able to pierce the armor of the admirals as did the quiet man from Massachusetts. It is simple justice to the latter and food for the aviation historians, therefore, to record these facts.

GEORGE M. BATTEY, JR.

SEEKING A HIDDEN PURPOSE

Brighton, N. Y., July 29.—What was the good derived from printing the article "I Could Fly, Just Give Me a Plane" printed in your recent publication of AERONAUTICS? It was not amusing and certainly not educational, as far as I can see!

If there is any hidden purpose in the article will you please notify me so that I will not remain in the dark longer. . . . .I am an admirer of AERONAUTICS and read it monthly.

JAMES DEG. BASSAGE

THE AERONAUTICAL ACADEMY AGAIN

Akron, Ohio, July 29.—Your suggestion certainly deserves the support of everybody who wishes to see this country maintain and strengthen its supremacy in the air.

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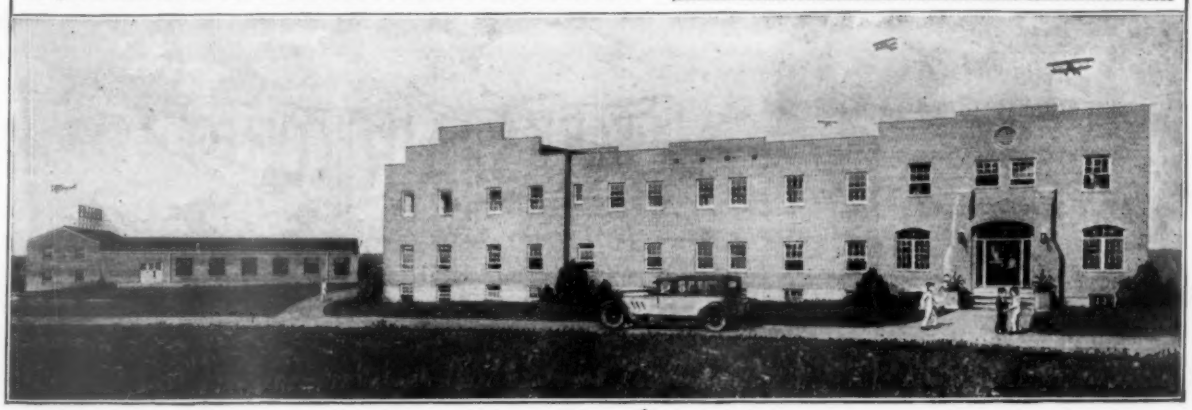

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THIS MAN FLEET

[*Continued from page 28*]

possible, for the Air Service at that time was only the stepchild of the General Staff and of Congress. There were no five year programs then! Suffice it to say that the men in the industry still tell what a hard-boiled customer Fleet was! And they also say, with a laugh, that he is just as hard-boiled now when he is selling his own product!—Which only goes to prove that one's attitude depends upon the side of the fence one is on.

He gave himself as unstintedly to the Service as he gives himself to his own business now. We, who worked closely with him, knew that when the day was too short to accomplish all our work, we worked into the night. The last few days of our fiscal year, he and all of us worked all night long! I remember one occasion when the office force left the Field at 5:30 A. M. And all of this activity was for the purpose of *spending* money! You see, every cent of the appropriations that remained unspent on July 1, reverted to the Treasury of the United States; and it wasn't wise to allocate all of the money early in the year, for aviation design in those years (1919-1922) was really less stable than it is today.

Possibly the mention of one appropriation only will explain just a little of the situation we were in. The Engineering Division was allotted the sum of $10.00 per quarter of a year for telegrams! How did we get around that? By a gentleman's agreement with the contractors that all telegrams from us would be sent them collect, and, of course, their answers would be prepaid; and that they would be charged to us on a purchase order under some such term as "bolts and nuts," or anything else applicable to their particular job.

Now you can understand why we needed a man of Fleet's type as Contracting Officer.

He drove his associates by the force of his own zeal. There were no loafers on his force; but, in turn, he was much more interested in the contents of their pay envelopes than the average Army Officer whose own pay is regulated by statute—regardless of his worth to the Service.

All was not pleasant working with him. Being of a nervous, flamboyant temperament, it was inevitable that there would be occasions when he would go on a rampage when things went wrong. I remember one occasion particularly when he threw everything off his desk—ink and all—because his secretary refused to work overtime. Whenever he had occasion to refer to any of the papers which had been among those on his desk that day and which, of course, were sadly marred from their nose-dive with the ink, he smiled and remarked — "This went through the war!" He wasn't ashamed of his outbursts; he rather gloried in being able to get away with them. But he was absolutely fair; if one were shouted at one day, and Fleet found he was wrong about it, he never forgot to apologize. It takes a big man to apologize to a subordinate.

He is tender hearted. One Christmas when various groups at McCook Field decided to play Santa Claus to the poor of Dayton, Fleet not only contributed money generously, but he made a personal investigation of the families assigned to us to see what was most sorely needed, and on Christmas morning he personally delivered our gifts! I've seen him approached by hungry men on the street; he doesn't give them money, but he does take them to dinner. He is basically a real philanthropist.

He is an individualist,—an egoist, too; what successful man is not? He loves to do the conspicuous thing; keep people waiting for him for hours; secure a table in a restaurant where reservations have long been exhausted; obtain admission to a big football game without tickets; convince the Police Department the traffic cop was wrong in moving his car, and insist and have it driven to the spot from which it was moved.

He is a delightful companion,—amusing, interested in people and in things; at home anywhere; enjoying everything except inactivity. He likes campfire suppers, and will even wash the dishes after one—and do a thoroughly good job of it.

As for hobbies, unless one could call his business that, I don't believe he has any.

His success has really been phenomenal when one considers that he formed the Consolidated Aircraft Corporation as late as 1923. Training planes have been their specialty, but recently they have developed a huge seaplane to accommodate from 20-32 passengers. The company owns its own airport of 90 acres, near Buffalo, including a factory site of 20. It also owns a sight-seeing and taxi company. It will, according to a recent press report, do a business of more than $7,000,000 this year.

The cares of his large business are showing on him a bit; he has learned that gates were designed to be walked thru, instead of jumped over. He has been tremendously successful, and has not yet nearly reached his zenith.

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A PILOT'S WIFE SPEAKING

[*Continued from page 53*]

now had enough. I answered "no, I was still game."

He gave me one of his smiles and we were gone. We circled over Houston, and back over the airport—there I was to learn the reason of the peculiar smile. He reached over and touched me and asked for my purse, and told me to see if my belt was securely fastened. I assured him that all was well—he gave her the gun, began to take altitude and we were off—loops, wing-turns, all the stunts, it seemed to me, he had learned during the army days. As a final dose for my benefit we spun from 2500 feet to 600 feet and then he fish-tailed me to the ground. Did I have enough?—No, it only made me all the more anxious to become a successful woman pilot.

His final admission as to my reaction in flying was that I was not emotional, I did not blow up in a crisis, and best of all that I was capable. He then went back to the only excuse a man has left concerning the average woman learning to fly—*it is not a woman's game*—it is not safe, one may never know what may happen while a ship is in the air. Of course it isn't going to happen, but if it should happen a woman has no right to be there—also there is danger both in the take-off and in the landing for that matter; it is all right for a man to take those chances, but it is wrong for a woman to, her place is on the ground: and so ended my instructions so far as he was concerned.

If he couldn't reason with me, frighten me or coax me, he would exert his husband's authority and would refuse to take me any more. He did occasionally take me, but was always ill at ease while I was at his side. He never again took me in a biplane. When I was fortunate enough to be invited to go along it was in a monoplane.

So to sum it all up, I think that the average pilot's reaction to a woman going into aviation is that he resents it more because he feels that it is a man's game. He feels that a woman is invading the last sacred sanctum left to man, and he uses the excuses that she is not fitted to be a pilot because of temperament and emotion.

All through the ages women have had to fight their way to reach the summit of their goal. Women going into aviation for business, as well as pleasure, and not for publicity purposes only, are going to have a harder fight than any they have yet had, but women will win. Before many years there will be any number of successful women pilots. The men will learn that even in this we have not been found lacking.

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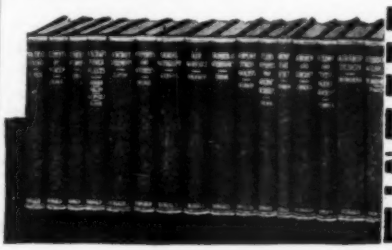

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COMBINING AIRPLANE and AUTOMOBILE SALES

[*Continued from page 15*]

he has learned that well. Probably the next factor in his consideration of selling airplanes along with automobiles was that he had been told it was a hazardous business, a flirtation with the undertaker.

In the mind of the automobile dealer these two apparent reasons in many cases were sufficient to discourage the idea of adding airplane transportation to his business and many have dismissed the matter from their minds.

There have been, however, some exceptions in various parts of the country and these exceptions were brought about either because of the dealers' knowledge of the airplane or, in some instances, because some individual in the organization possessed that knowledge.

Airplane manufacturers undoubtedly will find, in attempting to develop this field, that the automobile dealer or distributor will demand as much of the manufacturer in the way of financial stability as the manufacturer will require of the dealer in credit rating.

As William Steinhardt, vice-president of Mission Airplane Services, San Antonio, Texas, views the subject of automobile dealers contracting for distribution of an airplane, they first should deal with an airplane manufacturer who has passed the experimental stage. That precaution will not make your demonstrator obsolete thirty minutes after you have purchased it.

"Go out to your local airport, secure hangar space for your demonstrator and engage the services of a competent licensed pilot. Your local newspapers will be forthcoming with more publicity than you ever had an idea of. This, incidentally, will boost the stock of your automobile enterprises. Your organization, too, will be getting on their toes. Something is about to happen—they will feel that their institution is going somewhere. Word of mouth advertising will go around the town. Your automobile owners will be coming in; they are all interested; and don't be surprised to find some buyers among those owners. It's your time to cash in on the good will that you have been years in building.

"Since aviation is the newest mode of transportation, the farsighted automobile dealer looks toward it to get in on the ground floor.

"Adding airplane sales to his business increases the dealer's overhead very little. The cost of a demonstrator and a ship in stock is not overhead, but rather an investment, the same as his stock of automobiles."

Mr. Steinhardt's declaration gives evidence of the automobile dealers' interest, yet this interest must be further cultivated. Automobile dealers cannot possibly know of the advantages of handling airplane lines unless they are told of those advantages, and none but the manufacturer is qualified to impart that information.

I suggest some of the points which might interest the automobile dealer:

1. A dealer's fixed expenses, automobile-airplane merchants generally agree, come from hangar space on a local field for his demonstrator. Other items usually considered as overhead can be made revenue bearing. This abnormally low expense account is brought about by the fact that the automobile dealer is already in business selling transportation. Adding aerial transportation simply increases his volume of sales.

2. It is important to remember that there is little difference between adding aerial transportation and adding another line of automobiles, excepting that the sales possibilities in aerial tranportation are by far greater, since the automobile lines are already too congested.

3. Many advantages accrue to the automobile dealer already in business who decides to take on an airplane account. The publicity that he will get from the local papers will help to boost his automobile sales as well as the airplane.

4. The newspapers are already supplying the automobile dealer with a great amount of publicity, but that is true of his competitor as well. The dealer will be surprised at the additional amount of publicity that will be forthcoming through his adding an airplane account, and it will be a kind that is read by the public. Later on, as airplanes become more commonplace, this advantage will not be as outstanding. The dealer who first takes on an airplane account along with automobiles, especially if he has been successful, will unquestionably set himself apart as the leader in his community as a transportation merchant.

5. An airplane demonstrator will unquestionably pay its way aside and apart from its revenue as strictly a demonstrator. An automobile dealer will have little trouble in getting his chamber of commerce and other civic organizations to co-operate with him in chartering the plane on various occasions. Proper management, of course, enters into this phase of it. If the dealer gives away a lot of it before he finds out he can sell it, his remuneration from side trips and hops will not be so great.

Since a great many dealers in automobiles came from the ranks of the buggy dealers, it is only natural to assume that the evolution from the automobile salesman and dealer will be the air man. Since it is a foregone conclusion that the airplane will not displace the automobile, it is only logical to assume that this new

[*Continued on page 104*]

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WOMEN'S ACTIVITIES

EDITED BY LADY MARY HEATH

RECORDS: The most important event in aviation affecting women for the past month is the publication of the decision of the Federation Aeronautique Internationale to create a classification of women's records.

The F. A. I. is the body which controls sporting flying all over the world. Its representative in the United States is the National Aeronautic Association.

In 1926 the F. A. I. turned down our proposition for separate women's records, but included in their rules the statement that women pilots shall be allowed, together with men pilots, to try for any given record. This rule is still in force.

The Secretary of the F. A. I. writes: *"Struck by the feminine activity in aviation, the conference of the F. A. I. has again taken up the idea submitted to it in 1926 and has decided to create a new category of records called 'Feminine Records,' comprising all the records recognized by the F. A. I.*

"When aviatrices surpass in their class a world record of the F. A. I. their performances will be inscribed in a list of feminine records and also on the world's record list.

"A special list of feminine records will be published on the official bulletin of the F. A. I.

"It is, of course, understood, that the control and the homologation of feminine records are under the same rules as others, that is to say, the national body representing the F. A. I."

The F. A. I. will recognize any records made after this new category was created on June 20th.

The following are the present records as given by the N. A. A. and represent the United States national records:

Altitude: May 28, 1929, Miss Marvel Crosson; Ryan Brougham, Model B-3, J-6 Wright motor; Mines Field, Los Angeles, Calif. *7,314 metres, or 23,996 feet.*

Duration: April 23-24, 1929, Miss Elinor Smith; Bellanca monoplane, type CH, Wright J-5 engine, 220 hp.; Roosevelt Field, L. I., New York. *26 hrs.-21 min.-32 sec.*

Speed: Louise McPhelridge Thaden, Oakland; Travelair; Hispano Suiza, 150 hp.; 1 mile straightaway course. *Speed, 156 mph.*

Miss Elinor Smith's fine record was broken during the past month by Mlle. Marie Bastie at Paris on a Caudron Aironette, with a 40 hp. Salmson motor. Mlle. Bastie remained aloft for 26 hrs., 48 minutes. Her performance also beat that of M. Maurice Finat, who stayed up in a machine of this type for 26 hrs., 30 mins. last summer.

It is very much to be hoped that the 57 women licensed pilots in the United States (more than in any other two countries of the world put together) will keep the record's committee of the N. A. A. and the F. A. I. busy.

Another matter of international importance is the creation of an International Women's Aeronautical Association by Mrs. Ulysses Grant McQueen, who has been so active in aviation in California. The F. A. I. has given its promise of support to this embryo organization in every country. All particulars of this body, which is still in the throes of birth, can be obtained from Mrs. McQueen, 141 N. Lafere Drive, Beverly Hills, California.

The National Women's Aeronautical Association (Mrs. Orra Heald Blackmore, President, Hotel Stevenson, Detroit, Mich.) is also new, but growing apace. Twenty state governors have been appointed and their names and addresses can be obtained from Mrs. Blackmore.

It looks as if the International League of Aviators would have to send its trophy for the finest woman flyer of the year over to one of the United States girl aviatrices for 1929.

The I. L. A. I. gives a very beautiful trophy yearly to both male and female pilots. The only condition is that the winning performance must have been done solo; in the case of a woman, with another woman as passenger.

The address of this body is Clos du Normand, Bois de Boulogne, Paris.

Clubs and individuals connected with our girls should make a note of this address and send in the names recommended early.

Medals are given for the runners-up.

A great deal of fine publicity has been given to the National Women's Air Derby, which will be en route when this comes off the press.

The *National Exchange Clubs* have to be congratulated in their five year program for the advancement of aviation, and the Santa Monica branch in particular for sponsoring and organizing this event.

I am informed by Miss Earhart that she will fly a Lockheed Vega. If she does, this entry, with her fine piloting, will be hard to beat.

The National Air Races are also marked by the inclusion of six women's events over the closed circuit course.

Modern aircraft is so beautifully produced and so easy to fly that it should make little difference whether a man or a woman is at the wheel.

A considerable amount of perturbation has been felt by women pilots for fear that in future events even the transport pilots among them will be debarred from open races, but I am assured by the National Air Race committee that this segregation of the sexes is in the nature of an experiment, and should attract a great number of women pilots who would never dream of entering against our really crack racers.

I would like to close this column by expressing my sincere thanks to the publishers for their co-operation in the interests of women's activities. We would be very grateful if the women pilots of the country and their friends would collaborate with us by sending in any interesting data they may have for next month's issue.

[*Continued on page 100*]

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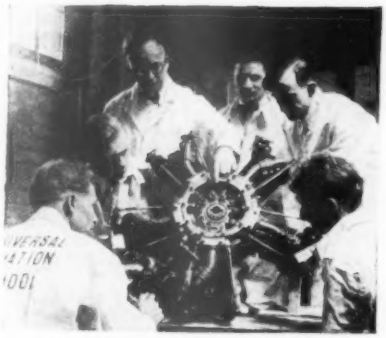

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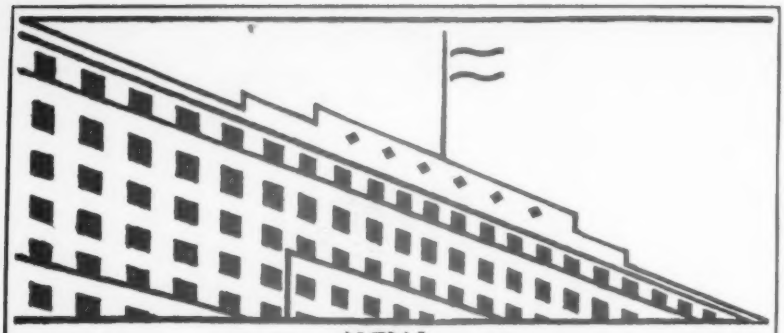

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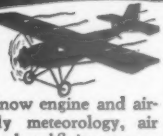

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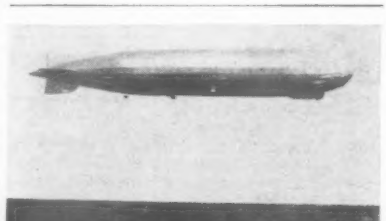

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WOMEN'S ACTIVITIES

[*Continued from page 98*]

Miss Maxine Dunlap, already a licensed pilot, is the first woman in the world to take her glider license. She is a member of the California Glider Club.

Miss Ruth Nichols has just completed a magnificent tour of 128 cities in a Curtiss Fledgling training plane. Miss Nichols, who flew solo, but was accompanied by a mechanic in a Curtiss Robin, was working in behalf of aviation country clubs. On her tour she won a fine race in a Commandaire machine at Glendale, California.

Mrs. Franklin D. Roosevelt, wife of the Governor of New York, was recently asked to christen the Consolidated Instrument Corporation's new machine. Mrs. Roosevelt declined to christen it until she had flown in it. A fine example of good sportsmanship.

Mrs. Kay Jones of Rochester, New York, and *Miss Helen Clinton* of Olympia, Washington, have just taken their licenses. Mrs. Jones intends to instruct in aviation. Miss Clinton went solo, I learn, in just over seven hours.

Miss Viola Gentry is recovering from her crash while so pluckily attempting a refueling endurance record. Miss Gentry's fine persistence in aviation must be applauded by every one. In 1926 she was the first woman to fly under Brooklyn Bridge, and one remembers that she had to earn her flying tuition money herself. Well done, Miss Gentry, the whole world wishes you good luck and a speedy recovery.

Miss Kathleen Kelly, Purchasing Agent for the Swallow Airplane Mfg. Co., reports a very busy and successful summer.

Miss Ruth Elder recently completed a 1,600-mile solo tour of California in a machine made by Miss Kelly's company.

Miss Amelia Earhart has been very active. She has accepted the chairmanship of the committee in charge of women's activities of the National Glider Club. She has been down in a diver's suit and in a submarine, and she recently traveled across the continent to grace the first eastward flight of the T. A. T. with her presence.

Both *Miss Elinor Smith* and *Miss Mary Dua*, a Belgian social worker, have made experimental parachute descents during the month.

Mrs. Phoebe Fairgrave Omlie did very well for herself and her company at the recent Des Moines meet. There is little about air racing this plucky woman does not know. Her story, as told in the current issue of THE AMERICAN, makes the very finest reading.

Mrs. Omlie put the Women's World's Altitude record up to over 25,000 feet a fortnight ago. This record is awaiting calibration by the Bureau of Standards and homologation by the N. A. A.

A couple of years back Mrs. Omlie came down with a parachute for 15,200 feet.

Miss Winifred Spooner took fifth place in Great Britain's largest race for the King's Cup. She took third place last year. The race over a 1,600-mile course was won by Flight Lt. Atcherley in a Grebe, averaging

[*Continued on page 102*]

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WOMEN'S ACTIVITIES

[*Continued from page 100*]

150 mph. There were five women entrants in this race, all of whom finished. Mrs. Allan Butler, a participant, had only seven hours solo work behind her.

Miss Spooner and the Hon. Lady Bailey are at the moment taking part in the F. A. I. light aeroplane race around Europe.

This contest comprises visits to eight European countries and covers 6,000 kilometres. There are between 60 and 70 entries, I am informed.

The Hon. Lady Bailey of Great Britain won the Belgian Aero Club Gold Medal for her fine flying in the Ostende meet.

Her Grace, the Duchess of Devonshire, aged 63, has just taken her private pilot's license on a D. H. Moth, and has financed a long-distance flight in a tri-motored Fokker from England to India. This aeroplane used to be the "Princess Xenia," that tried to cross the Atlantic with Mackintosh and Fitzmaurice aboard, but was obliged to return.

Mlle. Lena Bernstein left Istres on July 5th in a light plane for a duration record (there is no official F. A. I. light aeroplane duration record or class). Her intention was to fly from the south of France to Scandinavia.

It is reported from India that the first Hindu woman, complete with Sari, has taken her flying license. If the East is opening its harem doors to let women into the air how can the West lag behind?

Southern Air Transport announces that it needs a woman pilot as sales representative. One who can address women's clubs and deal with press propaganda will be given preference.

Mrs. Louise McPhetridge Thaden, as well as arranging for an endurance record with Miss Tront as co-pilot, has recently been to Wichita to collect her Travelair mount for the Air Derby. Miss Tront will fly her Golden Sagilett monoplane.

Mrs. Short has taken over the secretaryship of that very active body in women's aeronautics, the Wichita Association. Mrs. Verts, the last secretary, recently resigned to organize a Glider Club in that city. Her new Glider Club is a great success in spite of one small mishap.

Mrs. Neva Paris was one of the Curtiss entrants in the Women's Air Derby. She flew a Curtiss Robin, with a Challenger motor.

Mrs. Keith Miller took delivery of her mount for the race at Buffalo on August 8th to fly it out to Santa Monica.

The British International Aircraft Show brought out the first woman aeroplane seller who conducted her own plane.

The Vicomtesse de Sibour has just returned from a completely-round-the-world trip with her husband in a Moth plane. They are both pilots. Two of the minutest blue suitcases you have ever seen accompanied them.

Their trip included a forced landing in the Atlas mountains, gazelle shooting from an aeroplane in Iraq and a call at the White House on the way through the U. S.

NEWS GLEANED FROM ALL QUARTERS

Mlle. Marie Bastie will be remembered as the co-pilot with the late M. Drouhin on his creation of the light aeroplane distance record of 1,175 kilometres last year. This record has just been broken for the U. S. A. by Mr. Zimmerman in a Barling, with a Genet engine, by a substantial margin. His distance was 1,725 miles.

Miss Dorothy Martin has been appointed "External Contact Man" to the Hays Aviation Corp., Syracuse, New York.

The Braley School of Aviation, Wichita, Kansas, reports the formation of a ground school and flying class of nine women residents of Wichita.

Mrs. Mary Alexander, auto dealer of Lynchburg, Virginia, is becoming the first woman plane dealer in the country. She is learning to fly at Roosevelt Field in order to get a better grip of her subject.

The British International Aircraft Show brought out the first woman aeroplane seller who conducted her own plane.

The Duchess of Bedford has completed return trip from India doing both ways inside of one week piloting her Fokker fully half way herself.

Eleanor Smith is engaged on Transcontinental tour with a Bellanca for Irving Airchutes Incorporated.

Mrs. Petit the first native Indian woman pilot has taken license at Bombay.

As we go to press we learn that Mrs. Louise McPhetridge Thaden of Pittsburgh came in first in the great Woman's Derby at Cleveland winning the first prize of $8,000.

Mrs. Phoebe Omlie arrived shortly after, becoming winner in the light plane class. We offer our heartiest congratulations to both of these outstanding examples of our virile womanhood.

Ruth Elder blushingly admitted that she had promised to become the bride of Walter Camp, Jr., after the race whether she won or lost.

We have a letter from the Vicomte de Sibour that he and his lovely wife are leaving England September first for another extended jaunt in their tiny "Moth"—their destination unannounced. —Ed.

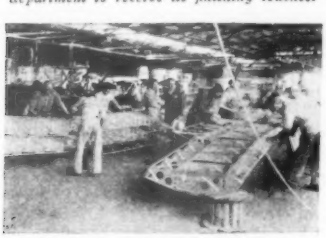
1 *Pilot Brastow greets you at the train. Don is a real friend, and will always be at your service.*

2 *The first sight to greet you—the large plant of the Nicholas-Beazley Airplane Co., where you study metal wing construction.*

3 *Now, through the Parts Department. Three quarter of a million dollars' worth of airplane parts always on hand.*

4 *Viewing the expansive wing department, where stamping, spot welding and riveting make a solid unit wing.*

5 *Inspecting one of the completed wings that goes to the covering and dope department to receive its finishing touches.*



6 *The finishing touches to a sturdy wing soon to soar skyward with a Marshall student at the controls.*

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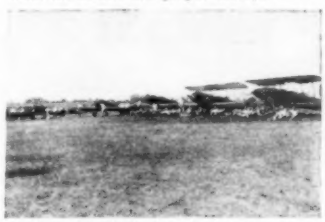
7 *Fuselage Department, where a frame is turned out every 4 hours. A tremendous demand here for efficient mechanics and welders.*

8 *In the motor room. Here you will spend many hours getting acquainted with the motors that propel aircraft.*



9 *The Marshall Airport, a Government emergency field on the route of 4 air lines. Showing some of the equipment at your disposal.*

10 *The Field Operations Office, where orders are transmitted to pilots of passing planes by signal flags on the roof.*

11 *An air-minded crowd watching operations at Marshall, Mo. There is always something going on at this field.*

12 *Completing arrangements with Mr. Souther for your training at the "College of the Air." Started on a wonderful new career!*

BROADFIELD MODEL PLANES

"Famous for Flights"

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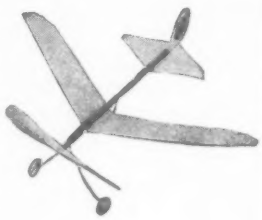
Flies Higher—Farther—Longer



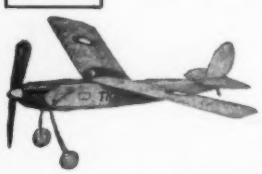
Here is a model plane of birdlike beauty that gives unsurpassed performance. Made record flight of 7 minutes, 15 seconds. Sweepback wings insure stability. May be flown indoors or outdoors. All die-cut parts of balsa wood. All wire parts formed. New 9" bent wood *Balsa* propeller.

The Giant Chic-A-Dee gives amazing performance. Created sensation at recent contest in Detroit. Possessing all ultra-modern construction features, it is truly a prize-winner in duration flights. Complete construction kit, quickly and easily assembled, is sent direct for $1.00. Big, new Catalogue sent FREE with order.

TIGER MOTH

$3.75 R. O. G.

"The Model Plane Beautiful"

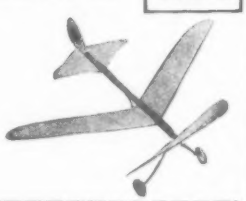


Tiger Moth is truly the aristocrat of the air. Exquisite in line and giving beautiful performance, it is the last word in model plane perfection. Weighs but 1½ oz. assembled. Main features are the removable propeller and motor stick and the adjustable wing stabilizer. Complete construction kit includes die-cut balsa parts, formed wire parts, sweepback wings, cabin, cement, air-tite covering, color dyes, winder, etc. Tiger Moth Kit is sent direct for $3.75. New Broadfield Catalogue sent FREE with order.

CHIC-A-DEE No. 1

R. O. G. 50c

Here is a smaller model plane that possesses all the finer features of the Giant Chic-A-Dee. Gives beautiful performance, both indoors and outdoors. It has new bentwood propeller and sweepback main wing. Complete construction kit, with directions, assures perfect and quick assembly. Complete Kit at 50c includes big FREE Catalogue. Check proper squares in coupon and mail today.



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Catalogue sent separately for 10c in stamps.

☐ I am enclosing $1.00. Please send me the Giant Chic-A-Dee Complete Construction Kit together with your new Catalogue.

☐ I am enclosing 50c. Please send me the Chic-A-Dee No. 1 Complete Construction Set. Also your new Catalogue.

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Rooms with running water *(for one)* $2.50 *(for two)* $3.50
Rooms with shower or bath and shower *(for one)* $3.00-5.00
***(for two)* $4.00-6.00**
Parlor, bedroom and bath $10.00-12.00 NO HIGHER RATES

COMBINING AIRPLANE and AUTOMOBILE SALES

[*Continued from page 96*]

transportation will be sold by the same units to which it is so closely allied, not only because both are transportation, but primarily because automobile organizations are so well adapted to add aerial transportation without adding terrifying overhead expenses. One can find further substantiation of this statement by recalling not so very long ago seeing a buggy, a phaeton and an automobile on a salesroom floor! All transportation!

Also: The public has become sufficiently airwise to support and make profitable dealers' efforts in the direction of handling airplane distribution.

A strong and psychological relationship exists between automobile-minded and airplane-minded and, although this relationship may assert itself in isolated cases, the isolation will grow less and less.

Merchandising of airplanes involves about nine-tenths of the principles of merchandising in the automobile field.

The dealer's experience in handling automobiles should enable him to outline a definite sales policy for airplanes.

An automobile dealer should use his same management, same sales policy, same office personnel, same financing lines in the airplane field.

If the dealer is not already a qualified pilot, he should obtain the aid of one for demonstration work and closing sales. Some dealers have found a valuable arrangement to be that of paying the pilot a definite sum for his demonstration work involving actual flying, with a percentage of the profits. Some add this commission to a guaranteed salary. Others apply the salary to total commissions earned.

As Charles Dallas, president of Buffalo Aircraft Distributors, Inc., has pointed out, "We have made our airplane demonstrators pay their own way while awaiting sales by carrying local passengers who wish to fly for the novelty of the thing, by carrying passengers on longer flights who choose such methods for business reasons, and by engaging in aerial photography.

"We are of the opinion that the automobile and airplane fields will not be separate, except possibly in the detail of demonstrating and the detail of warehousing, but even such separation will be that of function rather than that of control, management, financing or distribution."

Undoubtedly, as production increases, the entire matter of sales and distribution will be usurped by specialists—but in this early and formative period it looks as if the automobile dealer were the aeronautical manufacturers' one best bet in contacting the general public.

FUTURE EVENTS

SEPTEMBER 21-29—International Air Circus, and pilots' reunion at Kansas City, Mo.

SEPTEMBER 28—Gordon Bennett Balloon Trophy Race, St. Louis, Mo.

OCTOBER 5-12—International Petroleum Exposition and Congress at Tulsa, Okla., 40,000 square feet to be devoted to aeroplane exhibits.

OCTOBER 5-21—National Air Tour for the Edsel Ford Trophy, covering approximately 4,400 miles, with stops tentatively arranged at Windsor, Toronto, Ottawa, Montreal, Portland, Boston, New York City, Philadelphia, Baltimore, Richmond, Charlotte, Greenville, Savannah, Jacksonville, Macon, Atlanta, Nashville, Louisville, St. Louis, Kansas City, Des Moines, St. Paul, Wausau, Milwaukee, Moline, Chicago, Kalamazoo and Detroit.

OCTOBER 12-27—Southwestern Aircraft Exposition, State Fair Grounds, Dallas, Texas.

OCTOBER 15—Start of South America Trade Extension Flight, a five months' tour of over 40,000 miles through Latin and South America, sponsored by the American Manufacturers' Export Association.

OCTOBER 24-25—American Road Builders Association Conference on Municipal Airports at Washington, D. C.

OCTOBER 29—November 22—World Engineering Congress, Tokio, Japan.

NOVEMBER 9-16—Western Aircraft Show at Los Angeles, Calif.

DECEMBER 1-9—International Aeronautical Exposition at Chicago. Auspices of Aeronautical Chamber of Commerce.

FEBRUARY (1930) 5-12—New York Aviation Show. Auspices Aviators' Post, American Legion.

APRIL 5-13—All-American Aircraft Show at Detroit.

MAY 3-10—New York Aircraft Salon at Madison Square Gardens, New York City.

THE DIESEL ENGINE

[*Continued from page 80*]

the power developed by a heat engine depends mainly upon the mean effective pressure and the number of power strokes completed by any one cylinder in a given period of time, and since mean effective pressures in two stroke Diesels compare favorably with those in four stroke types, it is obvious that the possibilities for extremely high power outputs per unit of displacement are extremely attractive, and this fact should not be lost sight of. Of course, this is also accompanied by smoother torque if an equal number of cylinders are used in both cases, although a power stroke frequency of 180 degrees is sufficiently smooth for aviation purposes in most cases and this can be met by an engine having what would otherwise be considered the small number of two cylinders.

However, since cylinder running temperatures cease to be a source of worry on the part of the designer of the Diesel aircraft engine, it is entirely possible and probable that the ultimate aircraft engine will be in the form of the in-line type having two cylinders and a counterbalanced 180 degree two throw crankshaft, the cylinders hanging below the crankshaft in inverted fashion, the advantages of which have been previously outlined.

Direct aircooling will no doubt be in vogue for small power planes, but when the size exceeds 200 horsepower, it will be found most practical to interpose some heat absorbing and dissipating medium between the engine and the point at which the heat is dissipated to the airstream.

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36″	6″	2″	$1.25
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Write for our free booklet on model construction

COMPRESSED AIR MODEL ASSEMBLY

Building the propeller and final assembly of parts.

by BERTRAM POND

IN previous issues of AERONAUTICS the construction of the tank, fuselage and wings, and motor of the compressed air model have been described. It remains for us to consider briefly the carving of a suitable propeller and the assembly of the whole model, ready to fly.

The propeller is made from an ordinary balsa wood propeller blank. If directions are followed explicitly you should be able to complete in a very short time a very accurate constant pitch screw which is of the proper size for the power of the motor to be described in a forthcoming issue. The only tools you will need for carving the propeller are a good sharp pocket knife, a pencil, ruler, a sheet of coarse and a sheet of fine sandpaper.

A balsa propeller blank, 1″x1 9/16″x 14″ should be laid out in the following manner. This method is very simple and it saves a large amount of balsa wood. If you carve the propeller in the ordinary manner it would be necessary to use a blank 1″x3⅛″x14″ to obtain the proper pitch layout. A propeller carved from a blank laid out in this manner is known as a "toothpick" propeller. Very carefully divide the propeller lengthwise into four equal parts and draw lines all of the way around the blank. Use a square to get the lines true. Then draw diagonal lines on the flat faces of the blank not from the corners of the ends of the blank as ordinarily done but from the points where the outer dividing lines touch the edges of the blank. Then set the blank on edge with the 1″ width uppermost. Measure ¼″ in from the side towards you from the right and on the side away from you on the left side of the blank. Turn the other edge up and repeat the operation.

Then in order to leave sufficient strength at the hub draw two parallel lines lengthwise of the blank ⅜″ apart on both sides.

Very carefully drill a 5/32″ hole right at the center of the hub. Be sure that the hole is drilled square with the face.

Cut away the balsa wood down to these lines and you are ready to carve the propeller. NOTE: A diagonal line should be drawn across both ends of the blank to indicate the slant the blades are to take in order to make a clockwise rotating propeller, since the motor rotates clockwise and the model is a tractor. If you were to build a pusher model airplane you would want a propeller carved opposite.

You will note in the drawing of the blank that as the diameter becomes greater, the width of the blank becomes greater in proportion to a point halfway from the end and that from there on as the diameter becomes greater the thickness becomes less in the same proportion so that the pitch is true pitch all of the way. The pitch in this case figures out to be approximately 13½″. This is obtained by the following calculation. 14x3.1416x½÷1 9/16. Be sure to keep the edges of the cut out blank true as these serve as guide lines in carving and any inaccuracy in these guide lines would cause an inaccuracy in the pitch along the blade. Some model flyers even blacken the edges which act as guide lines so that they will be sure not to cut into them or sand these guide lines away in making the propeller.

Holding the blank with the left hand carve away the upper right hand edge of the outer end. Repeat this operation on all four edges by turning the blank over and then turning it end for end. Be careful in carving that you carve towards you on the lower right hand edge of the blades and away from you on the upper right hand edges of the blades to prevent splitting. When you have carefully carved down as close to the black lines as you can and pared away the wood around the hub so that both sides are alike, sand the propeller down as smooth as possible with coarse sandpaper.

Remember in the carving and sanding operations that the bottom side of the propeller blades should be practically flat or very slightly concave and the front sides of the propeller should be rounded slightly with the high part of the rounded surface nearer to the front or entering edge than to the trailing edge.

Also make the propeller blades much thicker towards the hub than you make them at the tips. At about 2″ out from

[*Continued on page 108*]

New Low Wing Monoplane

for Silver Ace Flying

F-21 LOW WING MODEL
Wing Span 25 inches Weight 3 oz.
Price, Ready to Fly, $7.00

THE entire fuselage of this fascinating new flying model is made of strong celluloid, beautiful in detail and color. Like all DeLuxe Silver Ace ships, it has a semiflexible propeller, detachable motor stick, shock absorbing landing gear, and silk covered demountable wings. In design and performance it will thrill you.

Send 10c for Silver Ace Illustrated Catalog with History of Flight

Describes and Pictures 18 Silver Ace models and construction sets. The most lifelike, longest-flying and most economical models produced by modern engineers. Light enough to save disappointment in the air; strong enough to give by far the lowest average cost per flight of any models you can buy or build. All first class dealers can supply you. If your dealer does not carry the Silver Ace line, remit to us, adding 50c for packing and shipping.

Silver Ace DeLuxe Cabin Type

Beautiful Fairchild or Stinson type, easily converted by demountable wings and pontoons into a biplane or seaplane. The best flying commercial model on the market.

Ready to fly monoplane	$12.50
Partly assembled	9.00
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Extra wings, per pair	3.50
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One of the latest Silver Ace models with demountable tapered wings and celluloid fuselage. Superlative in performance and appearance.

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Aero Model Company

DEPT. P10

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Model Airplane

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"American Eagle"

Wing Span: 26 in. Weight: 3¾ oz.

Distinctive in design—new in construction—a light, durable, fast-flying model with IDEAL'S twenty years' experience behind it, and months of dependable performance before it! Wonderful stability in the air, and GUARANTEED to FLY when hand or ground launched. Made largely of Balsa wood, with many new construction features; motor can be wound with winder without removing from fuselage; indestructible landing gear; new type propeller. Construction Set is easy to build; also sold completely assembled.

Construction Set--$2.50 **Assembled Model--$5.00**

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3-ft. Model Construction Outfit - - $8.50

Sold by Toy, Sporting Goods and Department Stores. Ask for IDEAL Model Airplanes. If unobtainable, order direct. West of Denver, prices are 50c higher.

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BALSA WOOD—new stock of featherweight balsa. Piece 1"x3½"x42", $.60.

DOPE—in ½ pint cans. For Japanese Tissue, $.35. For airplane fabric, $.45.

JAPANESE TISSUE PAPER—21"x31", extra light and strong sheets. 5 sheets, $.25.

RUBBER—fresh Para. Extra long 225 foot skeins of ⅛"x½2", $1.10. 1/16"x1/16", 170 foot skeins, $.85. 50 feet of either, $.30.

Universal Model Aircraft Co.
2905 East 33rd St. Kansas City, Mo.

Attention
Model Airplane Builders

Specials for Month of October:

3 Sheets of Superfine Tissue	.10
10" Carved Propeller	.50
1 Doz. ⅛ Screws	.05
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Balsa Propeller Blanks

These are cut to shape ready for carving

6"	.08	7"	.10
8"	.12	9"	.14
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COMPRESSED AIR MODEL ASSEMBLY

[Continued from page 106]

the hub they should be about ¼" thick and taper uniformly to about ⅛" thick within ½" of the tips. Then to complete the propeller you have only to round off the tips. A paper pattern should be used for this operation so that both ends will be alike. Be careful in rounding the tips that you get the paper pattern centered. This can be done easily by putting a pencil mark right at the end of the pattern in the center. Then locate the center of the squared propeller blades by measuring and lay the mark on the paper pattern on top of the mark on the propeller.

After the tips are rounded, sand down the square edges which are left from the top or rounded side so that you will have a neat appearing propeller just like a big airplane propeller.

At this point it is necessary to very carefully balance the propeller by balancing it on a knife edge. Sand the heavy end until both ends are of equal weight and the propeller just balances at the center.

Thin the hub down to about 7/8" in thickness for about 1" on the top and bottom side of the hub by taking 1/16" off both sides of the hub.

Sand the propeller all over now with fine sandpaper and give it three or four coats of banana oil or paper cement with a light sanding with fine sandpaper between each coat. Give the propeller a final check for accurate balance and when this has been obtained the propeller for your big powerful compressed air model is completed.

We are now ready for the final stage in the construction of the compressed air model. With our fuselage and tank ready, our propeller carved, and our motor assembled and ready to "rev" up as soon as the air is turned on, all we have to do is put the little plane together, adjust the wing, and set her for her maiden take-off.

The motor should be installed by the use of three strips of physicians' ½" adhesive tape. In case of emergency a good sticky electricians' or bicycle tape will do. Do not use rubber bands as when the air is completely gone from the tank at the end of a flight the rubber bands will be liable to collapse the walls of the tank whereas the adhesive tape will not do this.

Attach the propeller to the shaft and be sure that it runs true. If the propeller is made from soft balsa wood, to prevent the nut from crushing the wood, a hub should be made for the propeller from a piece of 3/16" outside diameter tube with a thin wall which will just slip over the crankshaft on the air motor. To keep the propeller from slipping on the shaft on account of the

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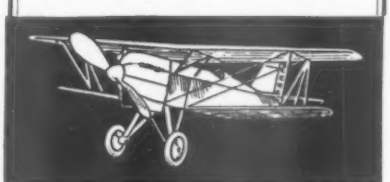

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great power of this tiny whirlwind air motor, a little washer or strip of metal should be attached to the front face of the propeller with a groove just ¼" wide filed into one side of the strip. The tightening nut on the crankshaft will then just fit into this groove. The direction of rotation is such that the tendency is to tighten the nut as the motor runs, in this way driving the propeller positively without any slipping. This is very important with such a powerful motor.

The wing, of course, is adjustable for flying balance on the fuselage. The wing is held in place with adhesive tape in the same manner as the tank.

Carefully check the machine all over for alignment and solid assembly. Be sure that the right side of the wing when viewed from the front has extra incidence to counteract the torque of the propeller. The model is now ready for a trial flight.

First, however, it may be advisable for you to do just a small amount of work on your pump so that it will pump the necessary pressure easily for operating your model. First, clean the bore of the pump thoroughly and liven up the leather gasket with oil or else install a new one. Remove the rubber hose from the pump and attach a slightly longer length of soft copper or brass tube and attach the same valve connection as was on the rubber tube. Oil the pump carefully and re-assemble it and you are ready for putting about 50 lbs. of air pressure in the tank.

This air model flies just a little faster than a rubber driven duration model so you should launch it at a slightly greater flying speed than you ordinarily would do with a duration model. Give the throttle valve nearly a full turn just the instant before you launch the model. After the first trial you can adjust your model from the flying conditions noted. Put considerably more pressure in the tank. Never put over 110 lbs. in your home made tanks. It will not be long before you are making real long compressed air model flights.

Those who want to experiment further may find it advisable to install a 5 ft. or even a 5½ ft. wing of the same light and efficient construction to increase the duration. However, this requires slightly greater skill in handling and the model cannot be flown on quite as windy a day.

This concludes the series of articles on the construction of the new compressed air machine. AERONAUTICS anticipates a large number of compressed air model airplanes in the Louisville contest so let's get busy and see who will win the gold, silver and bronze medals and other honors in this event.

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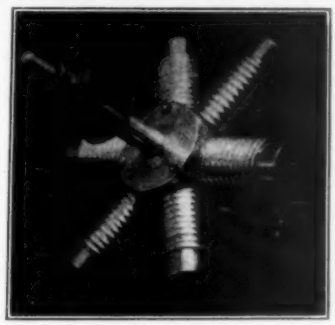

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THE TWO HOUR WAR

[*Continued from page 72*]

The United States and Russia, with their great areas, cannot be obliterated with the same praiseworthy dispatch as can the other great powers. (England and Japan on their crowded islands obviously will be subject to the most efficient extinction.) But a swarm of planes setting out from Toronto could well finish Buffalo, Rochester, Boston, New York, Philadelphia, Baltimore, Washington, Pittsburgh, Cleveland, Detroit and Chicago in a reasonably short time. Particularly complete would be the termination of New York. With her bridges and tunnels bombed, with her many tall buildings crashing like glorified tenpins, with her super-congestion, citizens would hardly have time to seize their check books before being summoned to the waiting rooms of the recording angel.

I see no possible way out. The technological design of the airplane—not the airplane of tomorrow, if you please, but the airplane of today—provides for precisely the results I have been chronicling. This is the sort of thing which airplanes, with bombs swung below them, pilot controlled or automatic, are perfectly equipped to do. Nor is there any known way to stop them. These bristling pictures of anti-aircraft guns in the Sunday Supplements, together with General Fossil's account of their range and accuracy, are an insult to the intelligence. These super dreadnaughts throwing up great walls of spume, beautiful as they are as pieces of engineering, are an even worse insult. These gas masks for every man, woman and child are the worst of all.

It is contrary perhaps to the code of the sportsman, but every now and then I know when I am beaten. I am willing to fight against the domination of as many peace-time mechanisms as you please, with a hazy but still enduring confidence in victory. But against a three-dimensional war machine, I have no confidence of anything save that the unique association of electrons which comprises myself is about to form new and interesting chemical combinations. This, I confess, intrigues my imagination, but no more than if you pointed a revolver at my head and gave me three seconds in which to die.

My notes show a whole galaxy of war machines which I have not even described—terrific affairs, but all operating in one and two dimensions. Yet for all this documentary remissness, I think that I have said enough. Perhaps I have said too much. There may be a practicable defence against the airplane among the secrets of the several Colleges of War, waiting for opportunity to prove its worth. If so, it is a secret that has been remarkably well kept.

One final qualification there must be. One can readily visualize the liquidation of two great nations in the next war, possibly of two coalitions; but hardly the whole of Western civilization, and certainly not the whole world. It takes a great deal of poison gas and many airplanes to kill two billion people. My guess would be that nothing will stop the defensive-offensive in the air of the two belligerents, and the neat balancing off, in a few hours' time, of all their temporal affairs.

The persons capable of imagining the holocaust in advance are so few, and of such slight influence—particularly in war and navy departments—that the world cannot realize what it now faces until it has faced it in a *fait accompli*. Then, and not until then, realization will come—possibly, as the extras bring one incredible horror after another, it will come very fast. Perhaps within a few days, after the two belligerents have liquidated their accounts, the neutral world will be in a sufficient state of shock to see that this sort of thing must stop. Forever.

The surviving West, together with the East, will then ban the machine from war—which means, of course, the banishment of war. . . . Or so the conclusion hangs, neatly balanced between the hope and the belief, within my mind.

IS ENDURANCE FLYING STUNTING?

[*Continued from page 35*]

Planes for such flights are usually constructed to anticipate bad flying conditions. Factors of safety must contemplate unusual stresses and strains, for there are no heavenly service stations to which the lone flyer can apply for first aid.

The physical and psychological make-up of the trans-oceanic flyer must permit him to undergo a strain equal to that he expects of his ship. A crackup here would be just as fatal as a faulty plane or engine.

At the conclusion of each successful hop over an uncharted or difficult course, another milestone is achieved for aeronautics. Many of us do not appreciate the value of these successes. The automotive industry proves its products on highly advertised racing tracks and other proving grounds. Just so, airplanes are being tested on flights that prove their mettle. It is a part of the ancient plan of trial and error. Progress cannot be achieved without some sacrifices.

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THE PUBLISHER'S QUILL

[*Continued from page 14*]

An article from his pen appears elsewhere in this issue. It discusses the situation, present and past, without mincing words.

Meanwhile, as the daily press carries announcements of a planned further division of the air services, in the form of a new aerial unit of Coast Defense, letters continue to pour in. Most of them are unqualifiedly in approval of the contentions voiced by AERONAUTICS in previous editorials. Some are printed on page 55 of this issue. A few others will be reproduced in successive issues.

The proportionate attitude of opinion in the aeronautical industry on this is indicated as follows:

For	75%
No definite opinion	9%
Against	8%
For, with modifications	5%
Prefer not to be quoted	3%

Among those giving their opinions are the following:

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A number of the letters received, some indicating a very definite opinion, nevertheless requested that neither their names nor letters be quoted in reference to what they felt was a controversial proposition. AERONAUTICS has of course honored these requests, but we wish to remark that it is only in frank and general discussion that a progressive and forward-looking platform can be carried out or soundly modified.

If it is true that American aviation will be greatly benefited by the adoption of change in method or arrangement, timidity or procrastination cannot bring the most in ultimate good even to those at present selling to the various Government agencies devoted to aeronautics. We further do not believe that the thinking members of these Governmental agencies are averse to a centralized Air Ministry. Not only should their patriotic feelings and good sense force them to lean in that direction, but their individual opportunities for development would be tremendously enhanced. Promotion lists and possibilities in this rapidly expanding business and art, would not be stifled and slowed down by subordination to the skirts of older branches in which the methods and personnel are practically fixed.

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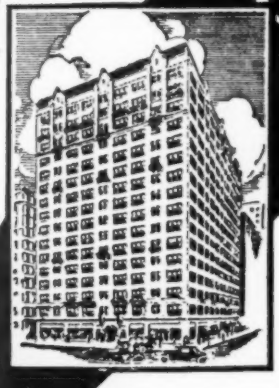

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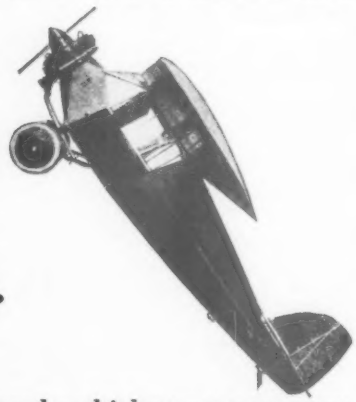

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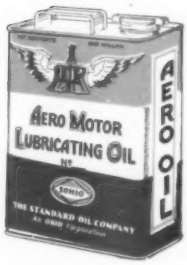

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